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REPORT NO T6-89

**DIETARY ASSESSMENT OF
U.S. ARMY BASIC TRAINEES AT
FORT JACKSON, SC**

**U S ARMY RESEARCH INSTITUTE
OF
ENVIRONMENTAL MEDICINE
Natick, Massachusetts**

JANUARY 1989



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**UNITED STATES ARMY
MEDICAL RESEARCH & DEVELOPMENT COMMAND**

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REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
1a. REPORT SECURITY CLASSIFICATION			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION / AVAILABILITY OF REPORT		
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE			Approved for public release; distribution is unlimited		
4. PERFORMING ORGANIZATION REPORT NUMBER(S)			5. MONITORING ORGANIZATION REPORT NUMBER(S)		
6a. NAME OF PERFORMING ORGANIZATION US Army Rsch Inst Environ Med US Army Rsch, Devel & Eng Ctr		6b. OFFICE SYMBOL (If applicable) SGRD-UE-NR	7a. NAME OF MONITORING ORGANIZATION US Army Medical Research & Development Cmd		
6c. ADDRESS (City, State, and ZIP Code) Natick, MA 01760			7b. ADDRESS (City, State, and ZIP Code) Fort Detrick Frederick, MD 21701-5012		
8a. NAME OF FUNDING / SPONSORING ORGANIZATION		8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER		
8c. ADDRESS (City, State, and ZIP Code)			10. SOURCE OF FUNDING NUMBERS		
PROGRAM ELEMENT NO. 63002D		PROJECT NO. 3M263002 D819	TASK NO. AI	WORK UNIT ACCESSION NO. DA305222	
11. TITLE (Include Security Classification) DIETARY ASSESSMENT OF U.S. ARMY BASIC TRAINEES AT FORT JACKSON, SC					
12. PERSONAL AUTHOR(S) R.W. Rose, C.J. Baker, C. Salter, W. Wisnaskas, J.S.A. Edwards, M.S. Rose					
13a. TYPE OF REPORT Final		13b. TIME COVERED FROM Aug 88 TO Dec 88	14. DATE OF REPORT (Year, Month, Day) 1988 December 19		15. PAGE COUNT
16. SUPPLEMENTARY NOTATION <i>fi. buck</i>					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP	Dietary Assessment, Military Basic Trainees, Army Nutrition Initiatives, Nutrient Intakes, Military Recommended Dietary Allowances, MREs, Rations, Cholesterol. (SNI)		
19. ABSTRACT (Continue on reverse if necessary and identify by block number)					
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20. DISTRIBUTION / AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION Unclassified		
22a. NAME OF RESPONSIBLE INDIVIDUAL Robert W. Rose			22b. TELEPHONE (Include Area Code) 508-651-4979		22c. OFFICE SYMBOL SGRD-UE-NR

DD Form 1473, JUN 86

Previous editions are obsolete.

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training; and the levels of nutrition knowledge, attitudes, and awareness possessed by soldiers who were just starting their Army careers. *Requirements.*

These basic trainees were consuming diets which met (or exceeded the Military Recommended Dietary Allowances (MRDA) for energy, protein, vitamins, and minerals. However individually, many females did not meet the MRDA for calcium (47%), Vitamin B₁₂ (30%) and iron (50%). Many of these inadequate intakes (i.e., nutrient intakes below the MRDA) were the result of low consumption of dairy products, eggs, and other animal products. These inadequate intakes were especially noted for females consuming total fat intakes between 25-29% of calories as fat (%FAT).

A direct association between serum total cholesterol levels and current dietary intakes of fat and cholesterol could not be determined for this sample because the majority of subjects were at an age where blood cholesterol levels were low due to age-induced changes, not lifestyle changes. Both male and female mean serum total cholesterol levels (males 140±25 mg/dl, females 163±28 mg/dl, Mean±SD) were well within the "desirable" classification as established by the Adult Treatment Panel of the National Cholesterol Education Program. Interestingly, subjects with serum total cholesterol levels >180 mg/dl, also were consuming diets with total fat intakes >35%FAT and/or higher levels of dietary cholesterol.

Both the male and female mean total dietary fat intakes for seven days were 34%FAT. This was the first sample of soldiers to achieve the Army's goal of total fat intakes less than 35%FAT. The absence of a short order line and limitations on high fat, high calorie bakery items (donuts, pastries, etc.) may have assisted in the attainment of this goal.

Although the study mean met the MRDA guidelines for total fat intake, 39% and 47% of the males and females, respectively, did not meet this goal. Differences in the foods eaten by individuals with total fat intakes <35%FAT and those >35%FAT suggested that higher levels of fat consumption were the result of over-consumption of menu items (e.g., dairy products, peanut butter, margarine, and salad dressing) to which subjects had free access and could adjust intakes as desired. Menu items from the meat food group contributed 45% of both the male and female fat intakes. Meat items contributing the greatest percent to total fat intakes were eggs, bacon, sausage products, pork, and breaded veal steaks for males. Females eating >35% FAT also were eating more of these high fat meat items.

Significant differences ($p < 0.05$) were determined between the cholesterol intakes of males and females (males 225±68 mg/1000 kcal, females 170±83 mg/1000 kcal). Mean cholesterol intakes were 703±208 mg/day for males and 418±219 mg/day for females. This significant difference in cholesterol intake was directly attributable to decreased consumption of eggs and other high fat meats by females in general.

Mean sodium intakes were above the MRDA upper limit of 1700 mg/1000 kcal (males 1856 mg/1000 kcal, females 1819 mg/1000 kcal). These sodium intakes were generally higher than those reported for other USARIEM studies. Sodium intake from table salt accounted for only 4% of the total sodium intake in the present study compared to 10% in earlier studies. Increased availability and consumption of high sodium commercially processed foods and the almost exclusive use of canned or high sodium frozen vegetables at Fort Jackson are probably the major factors leading to these higher sodium intakes. Menu items from the meat/entree group (33%) and the grain group (33%) were the major sources of sodium. Vegetables (9%) and table fats (9%) were also significant sources.

These data suggest that nutrition initiatives which have focused on the frequency with which high fat, high sodium menu items are served or those aimed at reducing the fat and sodium content of existing recipes may have achieved their maximum results. Continued efforts along these lines without the introduction of new menu items or ingredients to the

Army feeding system may meet with minimal success. This conclusion is supported, in part, by the fact that the greatest percentage of fat, cholesterol, and sodium intakes were the result of soldiers eating menu items over which the dining facility had little control in terms of product formulation (i.e., eggs, bacon, ham, etc.). Another fact supporting this conclusion was the fact that over 50% of the males and females consumed diets with <35%FAT.

Nutrition education programs which stress the contributions of foods to nutritional well being as well as the importance of moderation in consumption may help some soldiers to lower fat and cholesterol intakes without increasing their risk of inadequate intakes of other essential nutrients. However, a vast majority of soldiers select foods for reasons other than nutritional value and will continue to do so regardless of nutrition knowledge. Present nutrition initiatives are primarily programs which reduce or eliminate foods without providing adequate alternatives. Excluding the 2% milk initiative, the present low fat, low sodium alternatives are meeting with limited success. The average soldier apparently does not accept low fat yogurt, low fat cottage cheese, or herb mixtures as popular menu items and only infrequently, if ever, will eat them if they are offered as alternatives to popular foods. Instead of serving these items as is, they should be used in recipes to replace the high fat, high sodium ingredients. As more soldiers are identified with high blood cholesterol levels, the demand for acceptable alternatives will increase, and if nothing acceptable is available, soldiers may continue past eating habits. The answer to the problem is very complex and to a large extent falls outside the boundaries of this report. However, the objectives of future nutrition initiatives should not be to reduce fat, cholesterol, and sodium intake by taking away foods, but rather, to develop highly acceptable and palatable menu items which also have the added benefit of being low fat, low in cholesterol, and lower in sodium.



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Human subjects participated in these studies after giving their free and informed consent. Investigators adhered to AR 70-25 and USAMRDC Regulation 70-25 in Use of Volunteers in Research.

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TECHNICAL REPORT

DIETARY ASSESSMENT OF
U.S. ARMY BASIC TRAINEES
AT FORT JACKSON, SC

Robert W. Rose, M.S., R.D.¹

Carol J. Baker, R.D.¹

MAJ Charles Salter, Ph.D.²

William Wisnaskas¹

MAJ John S. A. Edwards, Ph.D.¹

LTC Madeleine S. Rose, Ph.D., R.D.¹

¹Military Nutrition Division, U.S. Army Research Institute of Environmental
Medicine, Natick, MA 01760

²Science and Advanced Technology Division, U.S. Army Natick Research,
Development and Engineering Center, Natick, MA 01760

ACKNOWLEDGEMENTS

The authors would like to gratefully acknowledge the outstanding cooperation and support of the military and civilian personnel of Ft Jackson. Without their help, it would not have been possible to collect such important and extensive data. Special thanks go to LTC Robert D. Ramsey and the cadre of the First Training Brigade, especially CPT Michael Banks, 1LT (P) Anthony Lewis, and SFC Thomas Campbell.

Mr. Preston Wider, Mr. Odom, Mr. Anthony Famiano, and Mr. James Worthy of Rice Services LTD are thanked for their whole-hearted support. Without their cooperation, we would not have been able to collect any of the dietary intake data. Knowing what the basic trainees ate would have been useless without knowing how the food was prepared. We thank the cooks of the 2-13 INF Consolidated Dining Facility for allowing us to gather information from them.

We would like to recognize the following USARIEM personnel for their assistance in the all important task of collecting data: Brooke Cheema, Neopur Patel, Regine Beakes, Rick Mahnke, Ann Merritt, Tanya Morgan, Linda Gowenlock, and Debbie Jezior. SSG C. Santiago-Morales and CPT E.G. Szeto provided much needed administrative and technical support. Carlo Radovsky is commended for his assistance in data reduction. Ms. Lori Parsons is especially recognized for her administrative support. This project would never have been possible and this technical report would never have been finished in such a timely manner without her help.

We would like to thank the following Natick Research, Development and Engineering Center personnel for their assistance in collecting or analyzing data: Dr. Barbara M. Quigley, Ms. Kathryn L. Rock, and Mr. Larry L. Leshner.

Finally, we would like to give special thanks to the 258 volunteer U.S. Army Basic Trainees from the U.S. Army Training and Doctrine Command (TRADOC) installation, FT Jackson, SC, who through their support and dedication made this study possible.

TABLE OF CONTENTS

CHAPTER	PAGES
ACKNOWLEDGEMENTS.....	iii
TABLE OF CONTENTS.....	iv
LIST OF TABLES.....	vi
LIST OF FIGURES.....	xi
ABSTRACT.....	xii
INTRODUCTION.....	1
REVIEW OF LITERATURE.....	3
Nutrition and Health Issues.....	3
Relationship of Coronary Heart Disease to Dietary Intakes.....	3
Hypertension and Dietary Sodium Intakes.....	13
Macronutrient Deficiencies in Females.....	15
Specific Objectives.....	15
METHODS.....	17
Sample.....	17
Data Entry and Analysis.....	18
Demographics and Diet Histories.....	18
Time Data.....	19
Nutrition Knowledge, Attitudes, Awareness.....	21
Recipe Analysis.....	22
Major and Minor Food Groups.....	26
Menu Analysis.....	26
Data Collectors.....	29
Observed Food Intake (Group 1).....	29
Measuring Food Intake in the Dining Facility.....	30
Measuring Food Consumption in the Field.....	32
Measuring MRE Consumption	32
Consumption of Foods Not Prepared by the Dining Facility.....	33
Data Validation.....	34
Analytical Methods (Dietary Intakes).....	34
RESULTS AND DISCUSSION.....	37
Demographic Characteristics of the Total Sample.....	37
Nutrition Knowledge.....	43
Nutritional Practices in the Dining Facility.....	48
Nutritional Beliefs.....	49
History of Meal Habits Prior to Basic Training.....	55

TABLE OF CONTENTS (continued)

CHAPTER	PAGES
History of Food Consumption Patterns.....	59
Characteristics of the Dining Facility.....	66
Characteristics of the Basic Trainee Meal Periods.....	68
Dining Facility Evaluation.....	70
Comparison of the Army Master Menu with the Study Menu.....	74
Dietary Intake Analysis.....	80
Field Feeding.....	80
Plate Waste.....	82
Nutritional Adequacy.....	86
Dietary Energy: Intakes and Food Sources.....	96
Contributions of Major Food Groups to Energy Intake.....	103
Dietary Protein: Intakes and Food Sources.....	107
Dietary Carbohydrate: Intakes and Food Sources.....	111
Dietary Fat: Intakes.....	114
Serum Total Cholesterol Levels and Current Fat Intakes.....	118
Dietary Fat: Major Food Sources.....	120
Foods Contributing to Higher Fat Intakes.....	128
Dietary Cholesterol: Intakes and Food Sources.....	143
Dietary Sodium: Intakes and Food Sources.....	149
SUMMARY AND CONCLUSIONS.....	156
RECOMMENDATIONS.....	162
BIBLIOGRAPHY.....	163
APPENDICES.....	169
Appendix A - MRDA for Selected Nutrients.....	170
Appendix B - Comparison of Dietary Fat Intakes in Military Dining Facilities.....	173
Appendix C - Approvals of the Human Use Review Committees.....	177
Appendix D - Assignment of Fort Jackson, SC as the Test Site.....	180
Appendix E - Volunteer Agreement and Volunteer Registry Forms.....	182
Appendix F - Sample of Demographic and Diet History Questionnaire..	187
Appendix G - OTSG Request to Collect Time Data on Basic Trainees...	197
Appendix H - Sample of Questionnaire on Nutrition Knowledge, Attitudes, and Awareness.....	199
Appendix I - Ration Record Data Collection Form.....	208
Appendix J - MRE Data Collection Forms.....	210
Appendix K - Dining Facility Menu.....	212
Appendix L - Field Menu.....	220
Appendix M - Analysis of the Study Menu.....	222
Appendix N - Variability in Observed Recipes.....	238
Appendix O - Comparison of Dietary Intakes in the Field and the Dining Facility.....	247
Appendix P - MRE Consumption.....	252
Appendix Q - Selection Rates of Foods.....	255

LIST OF TABLES

NUMBER		PAGES
1	Mean Daily Intake of Selected Nutrients During Three Dining Facility Studies for Soldiers Eating Three Meals a Day in an Army Garrison Dining Facility.....	12
2	Racial Characteristics of Basic Trainees.....	38
3	Mean Age (years) of Subjects by Race.....	38
4	Distribution of Subjects by Age Grouping.....	39
5	Distribution of Subjects by Region of the Country of Longest Residency.....	39
6	Education Level.....	40
7	Marital Status.....	41
8	Physical Characteristics of the Basic Trainees.....	41
9	Mean Serum Total Cholesterol (mg/dl) Levels for Male and Female U.S. Army Basic Trainees of Various Age Groups.....	43
10	Nutrition Knowledge of Basic Trainees Based on 14 Multiple Choice Questions.....	45
11	Additional Nutrition Knowledge of Basic Trainees based on 7 True/False Questions.....	46
12	Distribution of Nutrition Knowledge Scores for Complete Questionnaire.....	47
13	Dietary Practices of Basic Trainees in the Dining Facility.....	48
14	Nutritional Beliefs of Basic Trainees.....	50
15	Percent Making the Correct Nutritional Choice.....	51
16	Percent Making the Correct Food Choices for Weight Loss.....	52
17	Hypothetical Consumption Choices.....	53
18	Meal Patterns of Male and Female Basic Trainees Prior to Basic Training.....	56
19	Type of Cooking Raised On.....	58
20	Location of Meals Before Military Service.....	58

LIST OF TABLES (continued)

NUMBER		PAGES
21	Consumption of Different Foods Prior to Basic Training Reported by U.S. Army Basic Trainees.....	60
22	Preference for Fried Foods Prior to Basic Training as Reported by U.S. Army Basic Trainees.....	62
23	Milk Consumption in an Average Day Prior to Basic Training as Reported by U.S. Army Basic Trainees.....	63
24	Types of Milk Consumed Prior to Basic Training as Reported by U.S. Army Basic Trainees.....	64
25	Number of Visible Eggs Eaten Per Week Prior to Basic Training as Reported by U.S. Army Basic Trainees.....	65
26	Attitude of Basic Trainees Toward Condiment Use.....	66
27	Comparison of Average Selection and Consumption Times for Basic Trainees and Other U.S. Soldiers.....	69
28	Evaluation of the Basic Trainee Dining Facility.....	71
29	Evaluation of Attitudes Toward Nutrition Information.....	73
30	Number of Meals Collected at Breakfast, Lunch, Dinner per Data Collection Site (Method).....	81
31	Analysis of Plate Waste for Selected Nutrients for Seven Days.....	83
32	Frequency of Reasons Cited for Plate Waste.....	85
33	Mean Daily Intake of Selected Nutrients for 7 Days for U.S. Army Basic Trainees.....	87
34	Distribution of Calcium Intakes Among Male and Female Basic Trainees.....	88
35	Types of Milk Consumed During Nine Meals in the Dining Facility.....	90
36	Mean Milk Consumption for Nine Dining Facility Meals.....	91
37	Distribution of Nutrient Intakes for Males and Females Where Inadequate Nutrient Intakes Were Noted.....	92
38	Mean Nutrient Density Index (NDI) for Selected Nutrients for Dietary Intakes of U.S. Army Basic Trainees.....	94

LIST OF TABLES (continued)

NUMBER	PAGES
39	Mean Nutrient Density Index (NDI) of Selected Nutrients for MALE Basic Trainees Consuming Different Energy (kcal) Levels..... 95
40	Mean Nutrient Density Index (NDI) of Selected Nutrients for FEMALE Basic Trainees Consuming Energy (kcal) Levels..... 96
41	Comparison of Mean Energy Intake Levels for Seven Days with the Desire to Gain, Lose or Maintain Weight..... 98
42	Mean Percent Contributions to Mean ENERGY INTAKE (kcal) of Protein, Carbohydrate, and Fat for Seven Days.....103
43	Percent Contributions of Major Food Groups to TOTAL ENERGY Intake (kcal) for Seven Days.....105
44	Percent Contributions of Major Food Groups to TOTAL PROTEIN Intake for Seven Days.....109
45	Percent Contributions of Minor Meat Groups to TOTAL PROTEIN Intake from Meats/Entrees.....110
46	Percent Contributions of Major Food Groups to TOTAL CARBOHYDRATE Intake for Seven Days.....113
47	Distribution of Subjects at Different Levels of Percent Fat Calories of Total Energy Intake (%FAT) for Seven Days.....114
48	Correlation Between Energy and the Percent of Fat, Carbohydrate, and Protein Intakes of Total Energy Intake.....116
49	Mean Dietary Intakes of Selected Nutrients by Individuals Consuming Different Levels of Dietary Fat as Calories (%FAT).....117
50	Mean Dietary Percent Protein, Percent Fat, Percent Carbohydrate, and Cholesterol (mg) Intakes for Individual Subjects With Serum Total Cholesterol Levels Over 180 mg/dl.....119
51	Percent Contributions of Major Food Groups to TOTAL FAT Intake for Seven Days at Breakfast, Lunch, and Dinner.....122
52	Overall Contributions of Meat/Entree Minor Food Groups to Total Meat/Entree Contributions to Dietary Fat Intakes.....122
53	Count of Visible Egg Consumption for Seven Days.....124

LIST OF TABLES (continued)

NUMBER	PAGES
54	Overall Contributions of Selected Fat Items to Table Fat Group Contribution to Total Dietary Fat Intakes.....126
55	Overall Contributions of Dairy Items to the Dairy Major Food Group Contributions to Total Dietary Fat Intakes.....127
56	Fat Intake (g) per 1000 kcal and Percent Total Fat Intake Provided by Selected Major Food Groups at Different Levels of Percent Fat of Calories (%FAT) for MALES.....129
57	Fat Intake (g) per 1000 kcal and Percent of Total Fat Intake Provided by Selected Major Food Groups at Different Levels of Percent Fat of Calories (%FAT) for FEMALES.....129
58	Comparison of Selection and Consumption Rates of Peanut Butter at Different Levels of %FAT Intake.....133
59	Overall Contributions of Minor Food Groups to Meat/Entree Food Group Contributions to Total Dietary Fat Intakes at Different Levels of %FAT Intake by MALES.....133
60	Overall Contributions of Minor Food Groups to Meat/Entree Food Group Contributions to Total Dietary Fat Intakes at Different Levels of %FAT Intake by FEMALES.....134
61	Percent Contributions of Selected Dairy Minor Food Groups to Total Dairy Fat Intakes at Different Levels of %FAT Intake.....138
62	Comparison of Selection and Consumption Rates of SELECTED DAIRY PRODUCTS at Different Levels of %FAT Intake.....139
63	Percent Contributions of Selected Fats from the Minor Food Groups to Total Fat Intakes at Different Levels of %FAT Intake.....141
64	Comparison of Selection and Consumption Rates of SELECTED FATS at Different Levels of %FAT Intake.....142
65	Distribution of Dietary Cholesterol Intakes at Breakfast, Lunch, and Dinner.....144
66	Percent Contributions of Major Food Groups to Total Sodium Intake...150
M-1	Mean Nutrient Value of the Study Menu.....224
M-2	Caloric Distribution of Protein, Fat, and Carbohydrate in the Study Menu.....225

LIST OF TABLES (continued)

NUMBER	PAGES
M-3 Mean Nutrient Density Indices of the Study Menu (Unit per 1000 Calories).....	227
M-4 Mean Percent of Nutrients Supplied by the Major Food Groups (DINING FACILITY MENU).....	229
M-5 Mean Percent of Nutrients Supplied by the Major Food Groups (FIELD MENU).....	231
M-6 Macronutrient and Sodium Content of Hypothetical Lettuce Salad.....	235
N-1 Mean Caloric Values and Variation for 100 gram Portions of Observed Recipes.....	241
N-2 Mean Values and Ranges for 100 gram Portions of Observed Recipes for the Nutrient SODIUM.....	242
N-3 Mean Values and Ranges for 100 gram Portions of Observed Recipes for the Nutrient CARBOHYDRATE.....	243
N-4 Mean Values and Ranges for 100 gram Portions of Observed Recipes for the Nutrient PROTEIN.....	244
N-5 Mean Values and Ranges for 100 gram Portions of Observed Recipes for the Nutrient TOTAL FAT.....	245
N-6 Mean Values and Ranges for 100 gram Portions of Observed Recipes for the Nutrient CHOLESTEROL.....	246
O-1 Comparison of Mean Energy (kcal) Intake by Location.....	249
O-2 Percent Contributions of Protein, Fat, and Carbohydrate to the Mean Energy Intake of Meals Eaten in the Dining Facility and Field.....	251
P-1 Mean Nutrient Intakes for MRE Meals.....	253

NUMBER	LIST OF FIGURES	PAGES
1	Major and Minor Food Groups.....	27
2	Menu Patterns For A Master Menu A La Carte Breakfast, Short Order Meal, and Lunch/Dinner Meal.....	75
3	Average Percent Contribution of Protein to Total Energy (kcal) Consumption.....	100
4	Average Percent of Carbohydrate to Total Energy (kcal) Consumption...	101
5	Average Percent of Fat to Total Energy (kcal) Consumption.....	102
6	Percent Contributions of Major Food Groups to Total Energy Intake (kcal) for Seven Days.....	104
7	Percent Contributions of Major Food Groups to Total Protein Intake for Seven Days.....	108
8	Percent Contributions of Major Food Groups to Total Carbohydrate Intake for Seven Days.....	112
9	Percent Contributions of Major Food Groups to Total Fat Intake for Seven Days.....	121
10	Percent Contributions of Major Food Groups at Different Fat Intake Levels of Males.....	130
11	Percent Contributions of Major Food Groups at Different Fat Intake Levels of Females.....	131
12	Percent Contributions of Food Groups to Mean Cholesterol Intakes.....	145
13	Percent Contributions of Food Groups to Mean Sodium Intakes.....	151

ABSTRACT

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and palatable menu items which also have the added benefit of being low fat, low in cholesterol, and lower in sodium.

INTRODUCTION

The Department of Defense (DoD) and the Department of the Army (DA) have both made major commitments towards improving the health status of soldiers and other members of the military community. Both active and passive personnel management procedures focusing on disease prevention have been introduced at all command levels to encourage beneficial lifestyle behaviors and to discourage behaviors which may adversely affect health and performance.

The Army Health Promotion Program, Fit to Win, was established recently in compliance with DoD Directive 1010.10 (DoD Health Promotion Policy) and Army Regulation (AR) 600-32 (Army Health Promotion Policy). This program was designed to integrate all existing and future health promotion/initiatives into one comprehensive installation effort and to establish an on-going Health Risk Appraisal Program (1,2). Major components of the Fit to Win Program address tobacco use, stress management, hypertension, nutrition, physical conditioning, and substance abuse (2). Improper nutrition has been associated with problems related to obesity and diseases such as cancer, coronary heart disease, and hypertension (2).

These nutrition related health issues have generated several recent DA initiatives which have been implemented in U.S. Army garrison dining facilities. Beginning in 1985, changes have been introduced to the Armed Forces Recipe Service, the Army Master Menu, and the Army Food Service Program in an attempt to modify the eating habits of soldiers (3-5). Overall these

nutrition initiatives are designed to decrease the soldier's consumption of dietary fat, cholesterol, and sodium; to increase the nutritional knowledge and awareness of the soldier and food service personnel; and to provide lower calorie, nutritious menu alternatives for soldiers eating in garrison dining facilities (6).

Following a 1985 Worldwide Nutrition Conference, the Office of the Deputy Chief of Staff of Logistics (ODCSLOG) tasked the Military Nutrition Division, U.S. Army Research Institute of Environmental Medicine (USARIEM) with evaluating the nutrient intakes of soldiers subsisting in U.S. Army garrison dining facilities and to evaluate the effectiveness of the nutrition initiatives (6). The present study was the fifth of that on-going series with studies at Fort Riley, KS (Study I), Fort Lewis, WA (Study II), and Fort Devens, MA (Study III, Study IV) preceding this effort.

Overall study objectives were to collect and analyze both dietary data and cardiovascular risk data from U.S. Army Basic Trainees. The purpose of this technical report is to present the information obtained from the dietary assessment phase of the study. The cardiovascular risk appraisal phase was presented in a separate technical report (7).

REVIEW OF LITERATURE

Nutrition and Health Issues

Today, health issues with nutritional implications primarily are related to overnutrition rather than undernutrition (8,9). Although hunger and undernourishment are problems for segments of the United States population, excess consumption of food energy (calories), total fat, saturated fatty acids, cholesterol, sodium, and alcohol characterize the diets of many Americans. Along with other U.S. lifestyle characteristics, these dietary excesses are believed to have significantly increased the incidence of coronary heart disease, hypertension, diabetes mellitus, liver disease, and obesity in today's society (9).

Relationship of Coronary Heart Disease to Dietary Intakes

Coronary heart disease (CHD) is a major cause of death and disability in the United States. Within the U.S. military population, CHD is the second leading cause of death after accidents (2). After the Korean War, a strong association was discovered between the incidence of CHD and the lipid deposits found in the aortas of U.S. soldiers killed in action (10). Since that time studies such as the Lipid Research Clinics Coronary Primary Prevention Trial, the Framingham Heart Study, and the Multiple Risk Factor Intervention Trial have definitely linked a multiplicity of risk factors to the disease process (11,12,13).

An elevated blood cholesterol level is the most significant risk factor for CHD (11,12,13). Cholesterol, an unsaturated steroid alcohol, is very

important to the body as a structural component of cell plasma membranes and as a precursor for the biosynthesis of bile acids and steroid hormones (14). However, high concentrations of plasma cholesterol have an atherogenic effect. They result in an accumulation of lipid molecules in highly immobile complexes in arterial walls which eventually leads to CHD (15). Therefore, the problem is an imbalance of the body's need with its supply of cholesterol. Cholesterol is obtained from both dietary sources and synthesis within the body. Dietary cholesterol probably accounts for a smaller portion of the body's total cholesterol levels since only about forty percent of dietary cholesterol is absorbed (16,17). Intakes of other dietary lipids, especially saturated fatty acids, appear to have a greater influence than dietary cholesterol on cholesterol synthesis and subsequent blood levels (16).

Plasma cholesterol is a constituent of several lipoproteins, however cholesterol attached to low density lipoproteins (LDL) and to high density lipoproteins (HDL) has the greatest impact on CHD development. Both of these lipoproteins are used in the body's lipid transportation system, with LDL being the principal cholesterol carrier (15). Since HDL and LDL blood levels are independent of each other throughout most of the human life cycle, both are excellent predictors of CHD risk (18).

Elevated LDL levels have been implicated as a significant CHD risk factor (19). When the body's transport system is working properly, excess cholesterol attached to LDL is cleared from the body by the liver via LDL receptor sites. However, for reasons which are not yet clear, LDL levels can rise due to the decreased capacity of the liver to clear these lipoproteins at the LDL receptor site and/or due to stimuli which cause the overproduction of

LDL (15). Age-dependent decline or genetic predisposition have been cited as possible explanations of decreased LDL receptor activity (15).

When cholesterol is attached to HDL, it does not appear to have the atherogenic effect of cholesterol attached to LDL (15). HDL acts as a scavenger to remove excess cholesterol from extrahepatic tissues and to transfer it to other lipoproteins for ultimate removal by the liver (15). While elevated LDL levels are associated with an increased risk of CHD, high HDL levels appear to have an inverse association (15). The Framingham Heart Study demonstrated that elevated levels of HDL were inversely related to the potential for developing CHD and that the ratio of HDL to both total cholesterol and LDL may be as important as knowing the independent levels of each (11,20).

Unfortunately, the causes of hypercholesterolemia are numerous and interrelated. Elevated blood cholesterol levels may be the result of genetic factors, dietary factors, or a combination of both (15,21). Several types of genetic abnormalities are known to affect blood cholesterol levels, but the relative contribution of each to the problem of hypercholesterolemia is not fully known (15,22-25). The most severe of all genetic disorders are the homozygous and heterozygous familial hypercholesterolemias (15,21). These two disorders affect gene encoding of the LDL receptors. Individuals afflicted with these disorders exhibit extremely high levels of blood total cholesterol and LDL cholesterol. However, these disorders probably account for only two percent of all blood total cholesterol levels over 240 mg/dl. The majority of high cholesterol levels are probably due to dietary factors and/or other unknown genetic disorders (15).

Diet makes a significant contribution to the hypercholesterolemia problem (15). Several dietary components have been associated with both increases and decreases in blood cholesterol levels. Results from epidemiological studies demonstrate that populations with a high incidence of CHD also have high dietary fat intakes, especially saturated fatty acids (26,27). Keys et al. (28) have shown that plasma cholesterol levels increase by 2.7 mg/dl for every 1% increase of energy as saturated fatty acids. The greatest portion of this increase is in the LDL-cholesterol levels (28).

Increasing polyunsaturated fatty acids in the diet while decreasing intakes of saturated fatty acids is known to have a cholesterol lowering effect (29-31). While both linoleic and oleic acids (major dietary ω -6 polyunsaturated fatty acids), reduce total cholesterol levels equally, linoleic acid has been found to adversely reduce HDL levels, whereas oleic acid does not affect HDL levels (30). Polyunsaturated fatty acids of the ω -3 fatty acid category, which are found in high concentrations in cold water fish are probably as effective in lowering LDL cholesterol levels as other polyunsaturates (15). High doses of ω -3 fatty acids have been effectively used in treating hypertriglyceridemia (15,32).

Dietary cholesterol appears to influence blood cholesterol levels, although blood cholesterol responses to cholesterol intake have shown a great degree of variability between studies and individuals. McNamara et al. (33) demonstrated that blood cholesterol response to differing levels of cholesterol intake may not be universal for all individuals. He studied the effects of alternating high (800-900 mg/day) and low cholesterol diets (200-300 mg/day) on blood cholesterol response. After a high dietary

cholesterol intake, eight subjects demonstrated significant increases in plasma cholesterol levels while three subjects exhibited significant decreases in plasma cholesterol. The majority of the 75 subjects appeared to compensate and exhibited non-significant changes in plasma cholesterol (33). However, Zanni et al. found a greater blood cholesterol response to high (~875 mg/day) and low (~130 mg/day) dietary cholesterol intakes (34). Kris-Etherton et al. (35) believe that the differences between the two studies (33,34) may in part be explained by differences in the definition of "low" cholesterol diets in the two studies. The study design of McNamara et al. (33) may have allowed dietary cholesterol levels of some of the "low" diets to be >500 mg/day where incremental responses of plasma cholesterol to dietary cholesterol changes are diminished. After a thorough review of the available literature, Kris-Etherton et al. (35) concluded that dietary cholesterol increases do increase blood total cholesterol levels but not with as great an impact as increases in saturated fatty acids.

Increased dietary intakes of complex carbohydrates and high fiber foods (especially water soluble fibers) have been advocated as effective means of lowering blood cholesterol levels when associated with decreased consumption of total fat, saturated fatty acids, and cholesterol (36). Water soluble fibers such as pectins from fruits, gums from legumes, and fiber in oat grain are especially effective (37,38,39). Van Horn et al. (36) demonstrated that oat products helped lower serum cholesterol levels significantly when subjects concurrently ate meals designed around the American Heart Association (AHA) guidelines. While dietary fiber does appear to be effective in lowering blood

cholesterol levels, problems with quantifying and classifying different types of food fiber have made data interpretation difficult (40,41).

Although not all of the questions concerning specific dietary components and their effect on CHD have been answered, sufficient data are available to make some recommendations. Three general approaches to diet modification for the prevention of CHD have been suggested (36):

1. Calorie control to prevent and reduce obesity;
2. Dietary fat modification; and
3. Increased intake of vegetable and grain products high in fibers known to influence serum cholesterol.

While little debate exists about using population-based educational approaches to reduce CHD risk factors such as cigarette smoking, some controversy does exist in using similar methods to advocate a CHD preventative diet (42). Most health professionals do not question the appropriateness of diet therapy in lowering cholesterol levels in hypercholesterolemic individuals, but they question the potential benefits and possible risks associated with a restrictive diet for the entire population (15,42).

Although the variability in individual response to specific dietary factors contributes to this controversy, possible risks associated with substituting other dietary components for fats and saturated fatty acids are perhaps an even more important factor. Substituting carbohydrate for fat to produce a very low fat diet or substituting polyunsaturated fatty acids for saturated fatty acids without lowering the total fat content of the diet may

generate other problems such as cancer, increased risk of gall stones, disruption of the immune system, and glucose intolerance (12,15,30,31,43-45).

A widely accepted recommendation of dietary intakes for fats, fatty acids, and cholesterol is not available on the national level. In 1980 the Food and Nutrition Board of the National Academy of Sciences (NAS) stated that a blanket recommendation for dietary change for the entire population was not warranted at this time (46). However, in the 1980 edition of the Recommended Dietary Allowances (RDA), the NAS did provide dietary guidelines for fat intake for individual consideration or for those individuals known to be at risk of CHD (46). These guidelines are:

1. A diet should contain 15-25 g of appropriate food fats which will meet body requirements for fat-soluble vitamins and essential fatty acids.
2. A diet with 3 percent of energy as linoleic acid should be a satisfactory minimum intake to meet the body's requirements.
3. Because of the apparent health effects related primarily to coronary heart disease, a polyunsaturated fatty acid intake of 8-10 percent of total calories (not to exceed 10 percent) may be beneficial.
4. For a high risk population, a total fat intake not to exceed 35 percent of dietary energy is recommended.
5. There should be a greater reduction in fats containing predominantly saturated fatty acids.
6. No recommendation is made for dietary cholesterol intake.

Army Regulation (AR) 40-25, "Medical Services Nutrition Allowances, Standards, and Education," provides a current statement of the military recommended dietary allowances (MRDA). Army policies concerning dietary fat intake are similar to the RDA. These recommendations are (47):

1. Total dietary fat should not exceed 35 percent of calories under garrison feeding conditions.
2. A 7 percent calorie intake of polyunsaturated fatty acids should be maintained.
3. No recommendation is made for dietary cholesterol intake.
4. No recommendation is made concerning saturated fatty acids.

The American Heart Association (AHA) is more stringent in it's recommendations for a CHD preventative diet. The AHA recommends (48)

1. Total dietary fat should not exceed 30 percent of calories.
2. Dietary cholesterol intake should be limited to 100 mg/1000 kcal, but not to exceed 300 mg daily.
3. The polyunsaturated fatty acid to saturated fatty acid intake ratio should be 1.
4. Polyunsaturated fatty acid intake should not exceed 10 percent of calorie intake.
5. Saturated fatty acid intake should not exceed 10 percent of calorie intake.

The AHA also recommends that diets should contain about 55 percent carbohydrate and 15 percent protein. The RDA does not make any specific carbohydrate intake recommendations. The RDA for protein intake is 56 g for adult males and 44 g for adult females (46). The Army's Nutrition Allowances, Standards, and Education regulation (AR 40-25) recommends that carbohydrates should contribute 50 to 55 percent of total dietary energy and that processed sugars should account for only 10 percent of total dietary energy (47). The MRDA for protein is 100 g for adult males and 80 g for adult females (47). A list of the MRDA for selected nutrients is found in Appendix A.

Estimates of the average American's dietary fat intake range from 34 to 44 percent of dietary calories, depending upon the source (42,46,49,50). Similar ranges of dietary fat intake have been shown to exist within the military population (Appendix B). Military nutritional studies conducted after the 1985 nutrition initiatives were implemented showed an apparent downward trend in fat consumption. This trend also has been demonstrated for the general U.S. population (49,50).

Table 1 lists the mean daily nutrient intakes obtained during the first three USARIEM dining facility studies (6,51,52). Data collected during these studies were from male soldiers. Mean intakes reported for Study I reflect meals eaten in the dining facility as well as foods eaten outside the dining facility. Mean intakes reported for Studies II and III reflect only foods consumed in the dining facility.

The mean results for these three studies indicate that soldiers eating three meals per day in a garrison dining facility exceeded the total dietary fat intake of 35 percent of calories recommended in AR 40-25 (47). The average intake reported for each of the three studies was very close to this recommendation, ranging from 37.4 percent to 38.2 percent. Mean intakes reported for dietary cholesterol varied from 677 mg to 761 mg/day. These cholesterol intakes exceeded the American Heart Association recommendations of 300 mg/day (48) by two-fold. Eggs eaten at breakfast were identified as the most common source of dietary cholesterol (6,51,52).

Table 1. Mean Daily Intake of Selected Nutrients During Three Dining Facility Studies for Male Soldiers Eating Three Meals per Day in an Army Garrison Dining Facility^a.

NUTRIENT	MRDA LEVEL OR TARGET	STUDY I (N=43)	STUDY II ^b (N=31)	STUDY III ^{b,c} (N=54)
Energy (kcal)	2800-3600	3112±758	3173±616	2978
Protein (g)	100	123±31.2	125±22.5	111
(%PRO) ^d	none	16	16	15
Fat (g)	none	130±43	132±32	126
(%FAT) ^e	35	37.6	37.4	38.2
Carbohydrate (g)	none	367.9±101	378.1±83	356
(%CHO) ^f	50-55	46.4	46.6	46.8
Vitamin A (mcg RE)	1000	1376±1305	1816±1026	1680
Ascorbic Acid (mg)	60	164±92	132±77	184
Thiamin (mg)	1.6	2.3±0.8	2.2±0.5	2.2
Riboflavin (mg)	1.9	2.5±1.0	3.2±0.8	2.5
Niacin (mg)	21 8	26.7±9.3	26.3±4.8	28.7
Vitamin B ₁₂ (mcg)	3.0	4.7±2.0	6.3±1.8	6.5
Calcium (mg)	800-1200	1335±597	1752±629	1236
Phosphorus (mg)	800-1200	2020±590	2231±487	1879
Iron (mg)	10-18	17.7±4.5	18.7±3.6	16.8
Sodium (mg)	-- ^h	5668±1705	5020±1487	4935
Cholesterol (mg)	none	761±296	744±219	677

^aResults and MRDA are for male soldiers (Mean±SD).

^bDoes not include foods eaten outside the dining facility.

^cStandard Deviations were not available.

^d%PRO=Percent of total energy from protein.

^e%FAT=Percent of total energy from fat.

^f%CHO=Percent of total energy from carbohydrate.

^gMRDA values for niacin are calculated in milligrams of Niacin Equivalents.

^hSuggested range: 1400-1700 mg/1000 kcal

NOTE: Study I - NCO Mess, Fort Riley, KS (6); Study II - Fort Lewis, WA (51); and Study III - Special Forces Dining Facility, Fort Devens, MA (52).

Hypertension and Dietary Sodium Intakes

Hypertension is a major cause of death and disability in the United States as well as a significant risk factor for CHD (9,19). Hypertension is defined as either a systolic blood pressure of at least 160 mm Hg or a diastolic blood pressure of at least 95 mm Hg (53). Specific medical disorders account for approximately one third of hypertension diagnoses in the United States, however, the etiology is unknown for the remaining two thirds of the diagnoses (54). Hypertension of unknown origin is termed essential hypertension.

High levels of dietary sodium intake have been associated with individuals with essential hypertension. Although scientists have speculated that high sodium intakes may actually cause some cases of essential hypertension, no cause and effect correlations between individual sodium intakes and blood pressure have been demonstrated (9,55). Although high sodium intakes have not been linked causally to essential hypertension, lowering sodium intakes is a well established treatment for individuals with known hypertension (9,54). Treatment regimens usually combine antihypertensive drug therapy with diet therapy (54).

Most Americans consume substantially more sodium than is physiologically required, since a healthy adult can maintain sodium balance with as little as 150 mg/day of sodium (46). Sodium intakes between 2300-6900 mg have been reported for individuals with free access to salt (56). The healthy human body excretes excess sodium in urine under normal conditions. Major sources of dietary sodium (46) are salt added in food preparation (at home or in commercial preparation) and salt added after preparation (at the table). While some foods are naturally high in sodium, commercial processing greatly

increases the sodium content of many foods which are naturally low in sodium (46).

Physiological requirements for sodium can vary depending upon factors such as the ambient temperature and the physical work being performed (46). For example, 46-92 mg of sodium is lost per day in insensible water loss under conditions of moderate ambient temperature, humidity, etc. (46); whereas, moderate work in the heat can cause a loss of six liters of sweat in 12 hours (0.5 L/hr sweat rate). These six liters of sweat can cause losses of 3450-8280 mg of sodium (575-1380 mg sodium/L sweat) per day (46,57). Soldiers acclimating to hard work at high ambient temperatures are advised that increased amounts of sodium may be needed (58). However, they are advised that additional salt added to their normal rations is sufficient to meet the increased requirement. This requirement is not necessary after the soldier has become acclimated to the hot environment. The use of salt tablets is no longer advocated in the military.

Because of the variability of sodium requirements under differing conditions, recommended sodium intakes are often expressed as ranges. The recommended intake of sodium for the Army is 1400-1700 mg/1000 kcal under normal conditions (47). For a 3000 kcal/day diet, the maximum recommended sodium intake would be 5100 mg/day using the upper limit of 1700 mg/1000 kcal. For the USARIEM dining facility studies (Table 1), mean sodium intakes for Study I are slightly over the maximum recommended sodium level at 5668 mg/day. The mean sodium intakes are slightly under the maximum recommended intake for Studies II and III (5020 mg/day for Study II, 4935 mg/day for Study III).

Macronutrient Deficiencies in Females

Low dietary intakes of calcium and iron are very common among female populations. Low calcium intakes by young women have been suggested as one of the causes of osteoporosis in later life (59). The MRDA for calcium intake is 800-1200 mg/day for both males and females (47). The incidence of iron deficiency in females is prevalent and of concern to nutritionists (60). The recommendation for female iron intake is 18 mg/day and for males 10-18 mg/day depending upon age (46,47).

Nutritional data for females were not reported for the first three USARIEM dining facility studies either due to the unavailability of female subjects or to the small sample of female subjects. Mean intakes of calcium and iron for males during these studies met or exceeded the MRDA for these nutrients (6,51,52).

Specific Objectives

Overall study objectives were to collect and analyze both nutritional data and cardiovascular risk data from U.S. Army Basic Trainees. The purpose of this technical report is to present the information obtained from the dietary assessment phase of the study.

Specific study objectives for the dietary assessment phase were:

1. To determine the nutritional adequacy (as defined by AR 40-25) of meals consumed for seven days by a sample of male and female soldiers undergoing U.S. Army Basic Training (BT) and eating meals furnished by a U.S. Army garrison dining facility.
2. To compare the nutrient composition of the dining facility menus to standards provided by Appendix J of AR 30-1 and the Army Master Menu (SB 10-260).

3. To determine the dietary patterns of a sample of basic trainees eating in an Army garrison dining facility in terms of food groups and menu item selection rates.
4. To determine the relative contribution of major and minor food groups to the nutrient intakes of male and female soldiers undergoing BT.
5. To compare the past dietary habits of basic trainees to present eating patterns.
6. To determine the level of nutrition knowledge, awareness, and attitudes of a sample of male and female soldiers undergoing BT.

METHODS

This study was approved by the United States Army Research Institute of Environmental Medicine and the Surgeon General of the Army's (OTSG) Human Use Review Committees (Appendix C). Data were collected at an U.S. Army Training and Doctrine Command (TRADOC) installation (Ft. Jackson, SC) in the southeastern United States during the first two weeks of August 1988. See Appendix D for documentation on the appointment of Ft. Jackson as a test site.

Sample

Volunteers for the study were recruited from six companies of one training battalion. The trainees were in their first to third weeks of basic training at the time of the study. Four of the companies were comprised of male soldiers and two of the companies were female. Each male company provided thirty-five initial volunteers and each female company seventy volunteers.

Prior to the start of data collection, the volunteers were briefed by the responsible and principal investigators for the study. Information presented in this briefing included: the purpose of the study; the data collection procedures; the subject's right to withdraw at any time from the entire study or any part of the study; the risk involved with the data collection procedures; the safety precautions to minimize potential risk; and the confidentiality of the data collected.

After this initial briefing, twenty-two of the initial volunteers decided not to participate in the study. No effort was made to recruit additional

volunteers. The remaining 258 volunteers were asked to sign Volunteer Agreement Forms and to complete Volunteer Registry Data Sheets (Appendix E).

The subjects were divided into two groups depending upon the types of data which were to be collected. Group 1 consisted of 41 males and 40 females and Group 2, 87 males and 90 females. Diet history data were collected from both groups. A modified visual estimation (MVE) method was used to collect food consumption data from Group 1 for seven days. A self-reporting food diary was used to collect food intake data from Group 2 subjects for three days and from Group 1 subjects for 4 meals (1 day + 1 extra breakfast). The self-reported data were collected to assess the feasibility and validity of this method for future dining facility studies. The results obtained from the self-reported data will be presented in a separate technical report (61).

Data Entry and Analysis

Unless otherwise noted, all data were entered into computer files at the study location. Zenith 248 personal computers were used with USARIEM developed data entry software to enter the data. The computer files were then downloaded into a mainframe Vax 780 Digital computer. Data analyses were performed using locally developed programs and the Statistical Package for Social Sciences (SPSSx) (62). All data are reported as Mean \pm SD.

Demographics and Diet Histories

Subjects from both groups were asked to provide demographic and diet history data in the form of a questionnaire (Appendix F). The questionnaire was administered immediately after the initial briefing. Questions were

developed from similar questions in the Army Health Risk Appraisal questionnaire and from dietary self assessment techniques found in The New American Diet (63,64). Demographic information included gender, age, height, weight, race, marital status, educational level, and region of country of longest residency. Information obtained from the diet history section of the questionnaire included frequency with which meals were commonly eaten and types of foods eaten during a typical week. Questions were phrased to capture data on eating habits for the period prior to entry into basic training. Prior to the administration of the questionnaire, subjects were also verbally instructed of this intention.

Frequencies, means, and standard deviations were determined for the responses of each gender. A Chi-Square analysis was used to test for significant differences between male and female responses.

Time Data

Data were collected to determine the length of time trainees were given and/or took to consume meals. These data were collected in response to an OTSG request (Appendix G). Prior USARIEM dining facility studies did not include time data collection or analyses except for some preliminary data collected during Study IV. These preliminary data from Study IV were used for a descriptive comparison with the time data collected during the present study.

Three different time descriptors were determined: time spent waiting in line to sign-in; time spent selecting and obtaining a meal; and the time spent

eating the meal. Time data were collected for six complete meals (2 breakfasts, 2 lunches, 2 dinners).

The time spent waiting in line to sign in was measured for an entire company. Each company was given approximately one half hour to proceed through the headcount position. The elapsed time was measured beginning with the appearance of the first individual of a particular company and ending when the last individual from that same company signed the headcount roster. A standard stopwatch was used for this measurement.

The time spent selecting and obtaining a meal was defined as the elapsed time beginning with a subject signing the headcount roster and ending with the time the subject appeared at the data collectors' table located at the end of each serving line. This time descriptor was measured only for subjects who were participating in the direct observation method of collecting food consumption data. As a subject was signing the headcount roster, his/her name was located on a subject roster and the time recorded by a data collector. When the subject finished selecting his/her meal and appeared before the data collector recording food consumption, a time-in was recorded for that subject to the nearest minute. Watches were standardized or times adjusted to reflect differences in watches. The time spent obtaining a meal was calculated by subtracting the time at which the subject signed the headcount roster from the time-in recorded by the data collector recording food consumption.

When the subject finished eating and presented his tray to be checked, the time-out was recorded. The time spent eating was measured by subtracting the time-in recorded by the food consumption data collector from the time-out recorded for each subject by the same data collector.

Nutrition Knowledge, Attitudes, Awareness

A modification of a questionnaire developed by Quigley et al. (65) for previous USARIEM dining facility studies was used to measure the level of nutrition knowledge, attitudes, and awareness in this sample of U.S. Army Basic Trainees (Appendix H). The questionnaire was administered to study volunteers immediately following the last meal of the study.

The survey administrator distributed the questionnaire, explained the nature of the study, gave detailed information about the various rating scales, and answered participants' questions. Because women constitute a minority in the Army, previous surveys have studied relatively few women. To overcome this problem, a disproportionate number of women from Fort Jackson were selected for this survey. The total survey sample of 159 consisted of 119 women (Group 1 and Group 2) and 40 men (38 from Group 1, 2 from Group 2). It is important to keep this gender imbalance in mind when interpreting the data or comparing it to other surveys.

Modifications to the original survey developed by Quigley et al. (65) were necessary to capture data on habits prior to entry into BT and to eliminate parts of the original questionnaire which required experience with Army unique institutions. Questions relating to demographic information, smoking behaviors, physical conditioning, weight loss/gain were added to this questionnaire. Some of the questions were duplications of questions asked on the demographic and diet history questionnaire (Appendix F) which had been administered at the start of the study. This duplication was necessary because the data were entered into separate automated systems and subsequent

use of this smaller data base may be required. Duplicate demographic and behavioral information are not included in this technical report.

Nutrition knowledge was measured by asking twenty-one questions presented in a multiple choice or true/false format. A score was determined for each subject by summing the number of correct responses. Missing responses were counted as incorrect when determining this score.

Recipe Analysis

Two registered dietitians served as Recipe Specialists in the kitchen to collect data on the types of foods served and on food preparation. Recipe preparation was observed to ensure that variations from the recipes in terms of weights and types of ingredients were taken into consideration when the recipes were analyzed by computer using food composition tables of the University of Massachusetts Nutrient Data Bank (NDB). The cooks were primarily using Version 2 of the Armed Forces Recipe Service, TM 10-412.

The Recipe Specialists split the day into two different shifts to cover food preparation three meals/day from 0400 hours to 1900 hours. During a shift, the Recipe Specialist covered the food preparation activities of all cooks (up to 10/shift) working that shift. The Recipe Specialists worked a late shift and then the following early shift to provide continuous followup of the food preparation. Preparation of the recipes which included multiple ingredients was observed: entrees; salads such as macaroni, potato, coleslaw; Harvard Beets; Creamed Ground Beef; Potatoes; Gravy; etc. Certain foods were not followed in minute detail every day because of similarity in observed preparation procedures or because preparation would not alter nutrient intake.

For instance, vegetables were checked quickly each day to determine if the cooks were adding any margarine or salt and to determine whether the item was fresh, frozen, or canned. Canned fruit, plain cottage cheese, Kool-Aid® type drink, fresh fruit, orange juice, grape juice, french fried veal and fish patties, etc. fell into the quick observation category.

Detailed observation of recipe preparation involved weighing ingredients with scales (Seca, accurate to ± 1 g; Food Service scales, accurate to ± 0.5 lb). Because of the need to reduce interference with the cooks' routines to a minimum, volume measurements were obtained when weighing was not possible or practical. Counts of cans, total weights of meat from the boxes, and weights of dry ingredients prior to cooking (e.g., spaghetti and grits) were obtained. If foods were procured in individual portions, three to four pieces were weighed before and after cooking to obtain an average weight. A calibrated measuring rod was used to determine volume changes in the 20 and 40 gallon steam kettles. The metal rod was marked off in inch segments and calibrated by quart measurements in each of the kettles. To insure that the rod was centered over the lowest part of the kettle, crossbars were fitted over the top of the kettle and the rod was run through the center hole. During the first few days of the study, pans were weighed so that the pan weight could be subtracted from the total weight of foods and pans, allowing ingredient weights to be determined by difference.

Since one person could not follow the preparation of all recipes, some recipes were estimated. Estimated recipes were based on the Recipe Specialist's judgement that the cook was following the instructions on the Recipe Card. The recipe was computer analyzed as written with the ingredients

that were available in that specific Food Service in that time period. Another type of estimated recipe was obtained by averaging several observed recipes. Some foods, such as coleslaw, potato salad, etc., were prepared and served two times a day and seven days a week. The Recipe Specialist could not follow food preparation every day because of the limitation on manpower and time, and because of the large number of recipes prepared each day. Hence, an average of the observed recipes was calculated and used whenever observed recipes were not available. Of the 269 recipes that were needed to analyze the dietary data for the entire study period, 124 (46.1%) were observed, 15 (5.6%) were estimated, and 130 (48.3%) were single ingredient recipes. Single ingredient recipes included foods such as margarine, cottage cheese, etc. where the food was matched to one food item in the computer data base. Another 31 single ingredient recipes were included to analyze the Meal, Ready-to-Eat rations (MREs) that the trainees ate in the field.

Before the recipes could be coded for computer analysis, the Recipe Specialist had to inventory the food supply store room, refrigerators, and freezers to gather information on the ingredients that would be used in recipe preparation so that similar items could be selected from the NDB. One problem in coding recipes was deciding on cooking losses. Losses were difficult to measure because of the difficulty in dividing the loss between moisture and fat. In most cases, the cooked version was selected from the NDB and the assumption was made that losses were similar. Another assumption concerned the amount of gravy or sauce that adhered to food and was consumed as the food was eaten. For items such as ham glazed with sauce, Harvard Beets, Spanish Steak, etc. approximately one eighth of the gravy or sauce was added to the

recipe for the food. The rest of the gravy or sauce was counted separately. For many of the canned items, the NDB values were for undrained foods, therefore it could only be assumed that subjects ate the syrups or fluids in which the foods were packed. Since the NDB was limited, it had to be assumed that the subject ate all of a deep fat fried food including the breading, even if the data collectors indicated that the subject discarded part of the breading. The limited data base also discouraged attempts to measure the amount of fat absorbed during deep fat frying.

During the coding of recipes, the following sources of information were used to determine losses, retentions, and conversions:

Moisture and Fat Content of Foods - from Release 6 of the USDA's Data Base for Standard Reference tapes (66)
Food Yields Summarized by Different Stages of Preparation, Agriculture Handbook 102 (67)
Federal Supply Catalog Stock List FSC Group 89 Subsistence (68)
Food for Fifty (69)

The recipe data were analyzed using the University of Massachusetts at Amherst, MA Nutrient Data Bank. The NDB is based on version 5 of the USDA Data Base for Standard Reference which has been updated with proprietary data. As the foods were prepared by the cooks for the meal, the Recipe Specialists measured out duplicate portions of each food for the data collectors to use as a standard for collecting dietary intake data by the MVE method. The standards approximated the actual serving size for each menu item. Overall, portion sizes were similar to those identified on the recipe card, since the serving utensils were similar to those recommended. The recipe specialist also was responsible for assigning each menu item a unique 3-digit code, a

6-digit recipe number, and a food group code and for entering the item with its standard weight and unit description into the automated recipe coding file. All serving sizes were entered as gram weights.

Major and Minor Food Groups

Menu items were organized into major and minor food categories to facilitate analysis. The primary recipe ingredient was used to determine food group placement. Overall, the food groups used in this study were similar to those used by the U.S. Department of Agriculture. A list of the major and minor food groups is provided in Figure 1. While a separate major food group (combination dishes) was used to categorize casseroles or mixed food dishes in the beginning, the results were pooled with those of the meat/entree groups during the final analysis.

Menu Analysis

The menu was analyzed using the same recipe data that was collected for the dietary intake analysis. The values for the estimated recipes were used whenever observed recipes were not available. The portion sizes were based on the median serving sizes observed by the data collectors for that specific day. If a food item was not selected by any of the observed test subjects on that day (i.e., serving size information was not available), the portion size used for menu analysis was the standard serving size as specified on the Recipe Card. By using the unique recipe and portion size for each day, the menu analysis reflects differences in the available nutrients from day to day.

Figure 1. Major and minor food groups.

Dairy

Milk Beverages
Cheese (Natural)
Yogurt

Meat/Entree

Eggs
Bacon
Sausage Products
Beef
Soy Extended Beef
Veal
Pork
Chicken
Turkey
Fish
Cured Meats

Combination Dishes

Beef/Grain
Beef/Vegetable
Beef/Grain/Vegetable
Poultry/Vegetable

Fats

Margarine
Salad Dressing
Coffee Whitener
Sour Cream
Gravies

Condiments

Catsup
Mustard
Pickles
Sauces
Salt

Desserts/Sweets

Jelly/Jam
Honey/Syrup
Sugar
Cakes
Gelatin Salads/Desserts

Grains

Cereals, cooked
Cereals, Ready-to-Eat
Pancakes, Waffles, French Toast
Bread, White
Bread, Wheat
Bread, Rye
Rice
Pasta

Legumes

Nut Butter

Vegetables

Potatoes
Yellow Vegetables
Dark Green, Leafy Green Veg
Starchy Vegetables
Other Vegetables
Tomatoes

Fruits

Citrus Fruits/Juices
Non-citrus Fruits/Juices

Crackers and Chips

Saltine Crackers
Chow Mein Noodles

Beverages

Coffee
Soft Drinks (carbonated)
Tea
Beverage Base

The menu was analyzed according to a method which assumes that one selection is taken from each food category. Whenever the soldier was allowed one choice from several foods in a category, e.g., one choice from six salads, the nutrient average was calculated from the values of all the offered items. To obtain the nutrient contribution of an item to the average, the unit portion size of the item was multiplied by a proportional fraction of the total number of items in the category. For example, of the three milks available on the menu, 0.33 was the decimal fraction used for low fat chocolate milk and for skim milk and 0.34 was used for 2% low fat white milk. So that the fractions added up to one, the decimal fraction of the item known to be selected more frequently or available in greater quantity was rounded up. This procedure of using the average contribution was used for the following food items: entrees, hot vegetables, hot starches, cakes, beverages, milks, fresh fruits, fat-based salads, cold cereals, breakfast meats, and breakfast hot breads. Leftovers were not included in the menu analysis. The analysis did include available accompaniments, such as gravies, sauces, sour cream, etc. This system of menu analysis is the method used to analyze the Master Menu, SB 10-260 (4).

The menu was analyzed for each meal, for each day, and for the entire study period of seven days. The menu data were obtained by summing nutrients in each of the food items or category of items, summing by meal, and then summing by study day. A value for the average daily menu was obtained by averaging the menus for seven days. Each macronutrient was calculated as a percentage of the total calories. Vitamins and minerals were expressed on a nutrient density basis, i.e., quantity per 1000 kcal. In addition, the menu

was analyzed to provide information regarding the nutrient contributions of the major food groups.

Data Collectors

Eight data collectors participated in this study. Six of the eight data collectors had previous training and experience using the MVE method for determining dietary intake at either another garrison dining facility study or field feeding study (6,51,52,70). One data collector was a registered dietitian and three were dietetic students. Regardless of background or experience, each data collector was required to participate in a training program immediately prior to the start of the study. After the training period each data collector had to demonstrate proficiency of >90% reliability before being allowed to collect data. Each data collector participating in this study met or exceeded all requirements. The training program was based on existing USARIEM procedures (71).

Observed Food Intake (Group 1)

Food consumption for 41 males and 40 females (Group 1) was measured and analyzed for seven complete days by the MVE method. Prior to the start of the study, data for two additional meals were collected to allow data collectors, recipe specialists, computer clerks, and subjects an opportunity to test equipment, become familiar with procedures, and adjust to new routines. Data for these two additional meals were not included in the dietary analysis.

Since meals were eaten in both the dining facility and at field locations and consisted of both standard Army A-rations (regular food) and operational

rations (MREs), adjustments were made in data collection methods and will be discussed in the following sections. Data were collected for seven complete but not consecutive days. A two day break was provided between study day 4 and study day 5. This weekend break was necessary considering the long working hours (10-12 hours per data collector over a 13-14 hour period) and the amount of detailed attention required by the nature of the work. The effects of collecting data over nonconsecutive days were believed to be minimal for this specific environment because the subjects' routines and the dining facility menu were not radically changed on weekends.

Measuring Food Intake in the Dining Facility

Procedures used to measure food consumption within the dining facility environment did not differ significantly from those used in previous studies (6,51,52). Each data collector was expected to collect data from approximately ten subjects. This ratio was slightly lower than in previous studies because the unique time constraints imposed by the Basic Training environment required faster turnover of subjects at the data collector station. In previous studies individual subjects were assigned to specific data collectors; however, this practice was not followed exclusively in the present study because of the need for quick turnover.

Subjects received instructions prior to the start of data collection to include: the purpose of the study; the importance of showing a data collector his/her food tray before and after eating; reporting additional foods selected after the initial meal selection; reporting foods eaten away from the dining facility; and collecting data in the field. The data collectors were located

in the two separate dining rooms of the dining facility. The data collectors were located at the end of the serving lines to allow them a clear view of the end of the serving line and of the dining facility exit. The milk dispensers and condiment tables were located behind the data collectors and out of their field of vision.

Data collectors were present fifteen minutes before the start of each meal period. This time was spent familiarizing themselves with the menu items being served for that meal and precoding data forms where appropriate (dates, meal, etc.). Data collection forms are provided in Appendix I. Each meal period was 1 1/2 hours in duration.

Prior to the start of each meal, the recipe specialist pre-weighed the menu standards for that meal and placed identical standards on each data collector table. Data collectors did not directly calculate food consumption, but were responsible for recording the portion size served and portion size returned. Both portion sizes were estimated against the pre-weighed standard portion. Portion sizes were recorded as decimal figures to the nearest tenth, where 1.0 was equal in size to the standard. The amount consumed was calculated by computer at USARIEM.

Estimation of condiment (including salt) and salad dressing consumption was simplified by the use of commercially prepared and individually packaged products by the dining facility. The only exception was sugar. Subjects participating in this study were provided individual packets of sugar at the data collectors' table and instructed not to use the sugar located on the dining tables. If bulk condiments were used, the recipe specialist prepared a pre-weighed sample to be used in estimation.

Data collectors were instructed to ask subjects the reason why foods were not entirely consumed (plate waste). The data collector recorded the original response given by the subject without interpretation or paraphrasing. Often the subject was unable or unwilling to provide a specific answer. Data collectors were instructed to solicit reasons for any amount of plate waste.

Measuring Food Consumption in the Field

Similar procedures were used to measure food consumption in the field and in the dining facility, with one major exception. Pre-weighed standards could not be sent to the field. Time, personnel, and equipment constraints would have precluded each individual data collector from setting up these standards in the field. In lieu of pre-weighed standards, data collectors were instructed to compare the size and type of serving utensil used for each menu item against the portion (unit) nomenclature found on the recipe coding file. This adjustment allowed a greater degree of experimental error to enter into the results, but was necessary under the circumstances. A degree of uniformity could be assumed, since identical serving utensils for specific menu items were sent to each field feeding site.

Measuring MRE Consumption

A self-reporting data collection form was used to collect consumption data when MREs were served to subjects (Appendix J). Since MRE components are packaged in individual units, standard unit weights were used. A data collector distributed the forms, checked them for completeness when the forms were turned in, and measured the consumption of those beverages not normally

part of the MRE operational ration (Kool-Aid type drink). MRE meals were served to two different male companies at two different lunch meals.

Consumption of Foods Not Prepared by the Dining Facility

During basic training the dining facility is almost the exclusive food source available to trainees. Food consumption in the barracks is prohibited, although packages of food may be received from home. Purchase of snack foods or beverages is prohibited except for canned fruit juices which are available in the company areas from vending machines. Other exceptions to this rule are meals which are eaten in the medical facility while awaiting treatment or meals eaten in other dining facilities while working as part of a special detail.

Data on foods that were not eaten in the designated dining facility during specified meal hours were collected through a dietary interview technique. When individuals indicated that they had consumed a meal elsewhere, the data collector recorded the items eaten and a description of the amount consumed. Snack items were recorded by the data collectors if subjects reported consumption of these items. The incidence of meals consumed elsewhere occurred in less than one percent of the total meals. The majority of the food items reported eaten elsewhere were single ingredient items such as hot dogs, hamburgers, french fries, etc. If a recipe was needed to analyze foods eaten from other sources, a standard Armed Forces Service Recipe was used.

The food diary which had been used in previous dining facility studies to collect data on foods eaten outside the dining facility was not used for this study. Subjects were reluctant to keep written records because of a

perception of possible disciplinary action. While this data may have been under-reported, the extent was probably minute, since access to snack items or other food sources was so severely restricted.

Data Validation

Before the raw data was entered into the automated system used in the field, several validation steps were used to eliminate human errors. Data collection forms were inspected for legibility, completeness, and accuracy by a data collector who was not responsible for the form's initial completion. After the data were entered into an automated file, a printed report was compared to the raw data form for verification. After the data collectors declared the data clean, a final validation was performed by the principal investigator. After returning to USARIEM, additional computer programs were used to check and validate the data. Changes were made to the data only if discrepancies were determined to be due to human error.

Analytical Methods (Dietary Intakes)

Data were analyzed using SPSSx statistical packages to perform t-tests, descriptive statistics, Chi-Squares, univariate analysis of variance, and Pearson correlations (62). Independent t-tests were used to determine differences in energy intake between field meals and dining facility meals. Univariate analysis of variance was used to determine differences in the mean nutrient intakes of males and females. Since a large difference in mean energy intake existed between males and females which could be due to body size, nutrient intakes were normalized to nutrients per 1000 kcal and then

tested for significant differences. Nutrient intake per 1000 kcal was reported as the Nutrient Density Index (NDI). Differences in mean nutrient intakes were tested for the entire seven days of the study. Differences in daily intakes were not tested since daily nutrient intake variations are less important than those over an extended period of time.

Initially, the study mean nutrient intake was determined by two different methods. The first method analyzed daily mean nutrient intake only on those subjects with complete data for all three meals. The second method was based on all subjects using a calculated individual mean meal value to replace missing data. Overall, only 39 meals out of 1701 total possible meals were missing. Since very minor differences of 1-2% were found between the two methods, the second method which replaced missing data, was used to determine the study mean nutrient intakes.

The percent contributions of the major food groups to total energy, protein, carbohydrate, and fat intakes were determined to identify the major sources of these macronutrients. For this analysis individual mean intakes were ignored. Although this method may not account for individual variance, the method was considered appropriate for identifying overall trends within the sample. The percent contribution of each food group was calculated by summing the total macronutrient intake from a specific food group and dividing that sum by the macronutrient intake for the entire study population. This formula was used to determine the total breakfast, lunch, dinner, and day percent contributions.

Percent contributions of minor food groups to macronutrient intakes were determined using a procedure similar to that for the major food groups.

However, contributions of minor food groups were calculated as the percent contribution of the minor group to the total major food group contribution to the macronutrient intake. When actual nutrient values were calculated for minor food group intake, individual mean intakes were used to account for individual variance.

Three factors should be remembered when interpreting these data. First, dairy products or entrees made with dairy products were not offered in the field. Since both males and females ate a greater number of lunch meals in the field, the overall contribution of the dairy group at lunch was reduced. Second, the nutrient contributions by the dessert/sweet group were higher at lunch than at dinner because cake was served at lunch. However, since cake was never served in the field, the effects of dessert items can not truly be assessed. The last consideration is the inclusion of MRE intake data in the male dietary intakes. Because the MREs were considered as a separate major food group, these data reduced the overall contributions of the other major food groups to the male nutrient intakes at lunch. The assumption may be made that if all meals were eaten in the dining facility, the contributions of the major food groups at lunch and dinner would be closer in value, since the menu patterns were similar and the same subjects were being observed at each meal. However, the schedule of the basic trainee includes meals in the field and so these menu changes must be included.

RESULTS AND DISCUSSION

Demographic Characteristics of the Total Sample

Volunteers participating in this study were members of six companies forming one basic training battalion. The battalion's strength was approximately 1200 basic trainees. The total sample for this study consisted of 258 volunteers or approximately twenty-one percent of the battalion strength. Observed dietary intakes were measured and recorded for 81 subjects (6% of battalion strength).

Study participants were members of the Regular Army, U.S. Army Reserve, and National Guard with a median time in service of 21 days. All subjects were working towards obtaining support related Military Occupational Specialties (MOS) upon completion of basic training. Military ranks held by the subjects were E1 (72%), E2 (11%), and E3 (17%). When asked to rate how much they liked the military on a seven-point scale, the average male response was 5.1 and the average female response was 5.4, where 5="like slightly" and 6="like moderately."

The physical and racial characteristics of the subjects are presented in Tables 2-4. Whites comprised 66% of the male sample, blacks 24%, and other races 10%. The racial mix of the females was 60% white, 28% black, and 12% others. Overall, the female subjects were a little older than the male subjects. The mean age for all female subjects was 20 years of age compared to 19 years of age for male subjects. The greatest difference between the males and females was the number of female subjects who were older than 25 years of age (Table 4).

Table 2. Racial Characteristics of Basic Trainees.

RACE	MALE			FEMALE		
	GROUP 1	GROUP 2	ALL	GROUP 1	GROUP 2	ALL
	(N=41)	(N=87)	(N=128)	(N=40)	(N=90)	(N=130)
	N (%) ^a	N (%) ^a	N (%) ^a	N (%) ^a	N (%) ^a	N (%) ^a
White	23 (56%)	61 (70%)	84 (66%)	25 (63%)	53 (59%)	78 (60%)
Black	13 (32%)	17 (20%)	30 (24%)	7 (18%)	29 (32%)	36 (28%)
Oriental	0 (0%)	3 (3%)	3 (2%)	0 (0%)	2 (2%)	2 (1%)
Hispanic	5 (12%)	4 (5%)	9 (7%)	7 (18%)	6 (7%)	13 (10%)
Other	0 (0%)	2 (2%)	2 (1%)	1 (1%)	0 (0%)	1 (1%)

^aPercentages have been rounded to nearest whole number and therefore may not add up to 100%.

Table 3. Mean Age (years) of Subjects by Race.

RACE	MALE			FEMALE		
	GROUP 1	GROUP 2	ALL	GROUP 1	GROUP 2	ALL
	(N=41)	(N=87)	(N=128)	(N=40)	(N=90)	(N=130)
White	19	19	19	19	20	20
Black	19	18	18	19	21	20
Oriental	--	19	19	--	18	18
Hispanic	18	20	19	20	18	19
Other	--	21	21	18	--	18
Total			19			20

The subjects came from every region of the United States with a predominance of subjects coming from the South Atlantic, East North Central and West South Central states (Table 5). The majority of the subjects were high school graduates with more of the females having attended college (Table 6). The majority of these basic trainees were single without ever having been

Table 4. Distribution of Subjects by Age Grouping.

AGE GROUP	MALE			FEMALE		
	GROUP 1	GROUP 2	ALL	GROUP 1	GROUP 2	ALL
	(N=41) N (%) ^a	(N=87) N (%)	(N=128) N (%)	(N=40) N (%)	(N=90) N (%)	(N=130) N (%)
≤19 yr	35 (85%)	64 (74%)	99 (77%)	30 (75%)	63 (70%)	93 (71%)
20-25 yr	5 (13%)	20 (23%)	25 (21%)	8 (20%)	15 (17%)	23 (18%)
26-30 yr	-	2 (2%)	2 (1%)	2 (5%)	8 (9%)	10 (8%)
31-35 yr	1 (2%)	1 (1%)	2 (1%)	-	4 (4%)	4 (3%)

^aPercentages have been rounded to nearest whole number and therefore may not add up to 100%.

Table 5. Distribution of Subjects by Region of the Country of Longest Residency.

REGION	MALE			FEMALE		
	GROUP 1	GROUP 2	ALL	GROUP 1	GROUP 2	ALL
	(N=40) N (%) ^a	(N=87) N (%)	(N=128) N (%)	(N=40) N (%)	(N=90) N (%)	(N=130) N (%)
New England	3 (7%)	5 (6%)	8 (6%)	1 (3%)	2 (2%)	3 (2%)
Mid Atlantic	3 (7%)	11 (13%)	14 (11%)	7 (7%)	5 (6%)	12 (9%)
E North Cent.	7 (17%)	16 (18%)	23 (18%)	9 (22%)	19 (21%)	28 (22%)
W North Cent.	3 (7%)	7 (8%)	10 (8%)	4 (10%)	9 (10%)	13 (10%)
S Atlantic	12 (29%)	15 (17%)	27 (21%)	2 (5%)	12 (13%)	14 (11%)
E South Cent.	2 (5%)	7 (8%)	9 (7%)	2 (5%)	11 (12%)	13 (10%)
W South Cent.	4 (10%)	14 (16%)	18 (14%)	7 (18%)	15 (17%)	22 (17%)
Mountain	4 (10%)	3 (3%)	7 (6%)	2 (5%)	8 (9%)	10 (8%)
Pacific	2 (5%)	8 (9%)	10 (8%)	5 (13%)	9 (10%)	14 (11%)
Other	0 (0%)	1 (1%)	1 (<1%)	0 (0%)	0 (0%)	0 (0%)
No Response	1 (1%)	0 (0%)	1 (<1%)	1 (3%)	0 (0%)	1 (<1%)

^aPercentages have been rounded to nearest whole number and therefore may not add up to 100%.

Table 6. Education Level.

EDUCATION LEVEL	MALE			FEMALE		
	GROUP 1	GROUP 2	ALL	GROUP 1	GROUP 2	ALL
	(N=41) N (%) ^a	(N=87) N (%)	(N=128) N (%)	(N=40) N (%)	(N=90) N (%)	(N=130) N (%)
Some High School	4 (10%)	3 (3%)	7 (6%)	1 (2%)	1 (1%)	2 (1%)
High School Grad ^b	30 (73%)	64 (74%)	94 (73%)	29 (73%)	58 (64%)	87 (67%)
Skilled Job Training	2 (5%)	2 (2%)	4 (3%)	1 (2%)	3 (3%)	4 (3%)
Some College	5 (12%)	12 (14%)	17 (13%)	8 (20%)	24 (27%)	32 (25%)
College Grad	0 (0%)	6 (7%)	6 (5%)	1 (2%)	4 (4%)	5 (4%)

^aPercentages have been rounded to nearest whole number and therefore may not add up to 100%.

^bIncludes GED

married (Table 7). The sample was very representative of the races and regions of the U.S. However the basic trainees were generally young, white, single, high school graduates from the eastern United States.

Subjects were asked about their physical dimensions and whether they were trying to gain or lose body weight (Table 8). For males, the average height was 69 inches with an average current weight of 163 lbs. For females, the average height was 65 inches with an average current weight of 129 lbs (1 lb heavier than their weight upon entering the service). When asked about gaining weight, 43% of the males said they were trying to do so compared to only 4% of the females. The average number of pounds that males wanted to gain was 14 lbs, and 8 lbs for the females. When asked about losing weight, 34% of the males and 62% of the females said they were trying to lose weight.

Table 7. Marital Status.

STATUS	MALE			FEMALE		
	GROUP 1	GROUP 2	ALL	GROUP 1	GROUP 2	ALL
	(N=41)	(N=87)	(N=128)	(N=40)	(N=90)	(N=130)
	N (%) ^a	N (%)	N (%)	N (%)	N (%)	N (%)
Single	35 (85%)	77 (89%)	112 (88%)	34 (85%)	73 (81%)	107 (82%)
Married	6 (15%)	9 (10%)	15 (12%)	3 (8%)	13 (14%)	16 (12%)
Separated	0 (0%)	0 (0%)	0 (0%)	2 (5%)	0 (0%)	2 (2%)
Divorced	0 (0%)	1 (1%)	1 (<1%)	1 (2%)	4 (4%)	5 (4%)

^aPercentages have been rounded to nearest whole number and therefore may not add up to 100%.

Table 8. Physical Characteristics of the Basic Trainees^a.

CHARACTERISTICS	MALES			FEMALES		
	GROUP 1	GROUP 2	ALL	GROUP 1	GROUP 2	ALL
	(N=41)	(N=87)	(N=128)	(N=40)	(N=90)	(N=130)
Height, inches	69	70	69	64	65	65
Weight, pounds						
Current Weight	155	167	163	130	128	129
Prior to joining Army	153	167	163	128	129	128
Trying to Lose Weight						
No	28 (68%)	57 (65%)	85 (66%)	11 (28%)	39 (43%)	50 (38%)
Yes	13 (32%)	30 (35%)	43 (34%)	29 (72%)	51 (57%)	80 (62%)
If yes, average pounds to lose	8	16	13	10	10	10
Trying to Gain Weight						
No	19 (46%)	51 (58%)	70 (55%)	37 (92%)	85 (94%)	122 (94%)
Yes	19 (46%)	36 (42%)	55 (43%)	1 (2%)	4 (3%)	5 (4%)
If yes, average pounds to gain	13	15	14	7	9	8

^aResults obtained from self-reported information.

The average number of pounds that males wanted to lose was 13, and 10 for females.

These data suggest that the majority of basic trainees were not satisfied with their current body weight. Males more often than females wanted to gain weight, presumably muscle mass. Although the height/weight standards for entering the Army are very similar to the standards for retention (AR 600-9) for females, males can join the Army at weights above the retention standards but must comply by the end of their Advanced Individual Training. Since 62% of the females wanted to lose weight, these data suggest that a majority of these females may perceive themselves as having a weight (body fat) problem while no problem exists. For whatever reason, there was a marked gender difference in goals regarding body weight changes.

Blood lipid levels were determined for this sample of U.S. Army basic trainees. Complete results were published in a separate technical report (7). A summary of the results on serum total cholesterol are presented in Table 9. Both male and female basic trainees had mean serum total cholesterol levels (males 140 ± 25 mg/dl, females 162 ± 28 mg/dl) well within the "desirable" blood total cholesterol classification identified by the Adult Treatment Panel of the National Cholesterol Education Program (19). A relatively small percentage of subjects (9% females, 3% males) were identified with serum total cholesterol levels exceeding 200 mg/dl, with the highest value of 239 mg/dl occurring in a female subject. However, the majority of these young individuals were probably experiencing an "adolescent drop" in which serum total cholesterol levels had not begun to increase, as may be expected later

Table 9. Mean Serum Total Cholesterol (mg/dl) Levels for Male and Female U.S. Army Basic Trainees of Various Age Groups.

AGE	MALE					FEMALE				
	N	MEAN (mg/dl)	SD (mg/dl)	MIN (mg/dl)	MAX (mg/dl)	N	MEAN (mg/dl)	SD (mg/dl)	MIN (mg/dl)	MAX (mg/dl)
Under 19	96	140	25	97	222	89	162	29	101	239
20-25	25	137	26	89	200	23	165	22	112	191
26-30	2	132	37	106	156	10	160	33	118	204
Over 30	2	160	10	153	167	4	161	33	115	188
Total	125	140	25	89	222	126	162	28	101	239

SD=Standard Deviation

NOTE: This table is adapted from Reference 7.

in life. After the age of 20, blood LDL cholesterol increases, on the average, as much as 40 mg/dl (19) without any major changes in lifestyle. Increases in LDL cholesterol are the major cause for increases in serum total cholesterol levels.

Nutrition Knowledge

The U.S. Army introduced in 1985 a series of nutrition initiatives to improve the nutrition knowledge, physical fitness, and health of troops. Three goals of the program were to instill in soldiers an awareness of the importance of nutrition, create a desire to eat nutritious meals and maintain a 'Fit to Fight' attitude, and educate soldiers to make appropriate food choices (65). Previous studies examined the nutrition knowledge of soldiers who were somewhat older and who had been in the Army for longer periods of

time (65). However, the present sample was at the Army's entry level, with most having been on active duty for only 21 days or less.

The level of nutrition knowledge was measured by testing the basic trainees on 14 multiple choice questions and 7 true/false questions (Appendix H). Table 10 presents the results for the multiple choice questions concerning nutrition knowledge. The items are arranged in descending order with the first item being the one most correctly answered by the entire group of subjects, while the last is the one most often missed. The results are presented for each gender separately. Data from an earlier sample of older more experienced soldiers are included for comparison with the basic trainees (65). The older sample included 74 males and 7 females (81 soldiers total) who ranged in age from 19 to 38 years, with an average age of 25. Their military ranks ranged from E-4 to E-6, with an average service length of 60 months.

Comparing the nutrition knowledge scores of basic trainees with those of the older, more experienced group indicated little difference between the two samples. With a few exceptions, the questions were answered equally well in both groups. More basic trainees knew the four major food groups than did the older, more experienced sample (trainees 81%, older soldiers 56%). Also, the older, more experienced group did not know the differences between low fat and whole milk as well as the trainees (trainees 51%, older soldiers 28%). However, since the previous sample was predominantly male and this sample predominantly female, the difference may not be due to experience or age but to gender. Comparing male basic trainees with female basic trainees indicated that females had higher correct scores for most questions. Females scored

higher on 11 questions, the same on 2, and lower on only one (Appendix H, Item #46; re: steak not being a good source of fiber). These higher scores may appear to be due to the higher education level of the females but the correlation between education level and nutrition score is not strong. This issue is discussed in more detail in a later section.

Overall, the level of nutrition knowledge as expressed by these results, was fair to poor. On 5 of the 14 multiple-choice questions, less than half of the trainees knew the correct answer. Very few knew the correct answer on the question regarding which nutrient type provides the most energy. Only 8% overall knew that the answer was fat, while the rest were evenly split between

Table 10. Nutrition Knowledge of Basic Trainees Based on 14 Multiple Choice Questions.

ITEM	PERCENT WITH CORRECT RESPONSE			
	MALES	FEMALES	TOTAL	OLDER GROUP ^a
Calcium helps bone/teeth	95	96	96	96
Food in same group as chicken	85	98	94	94
Best food choice for reducing	80	90	87	84
Protein in meat/fish/fowl	85	87	87	88
Four major food groups	75	83	81	56
Fast foods high in salt/fat	50	72	66	66
Food lowest in salt	40	65	59	59
Daily caloric needs of males	53	61	59	60
Low fat milk has less kcal & cholesterol, equal nutrients as whole milk	33	57	51	28
Steak not good fiber source	53	40	43	40
Foods containing iron	35	41	40	56
Foods providing B vitamins	35	35	35	39
Where carbohydrates found	25	37	34	24
Nutrient giving most calories	8	8	8	28

^aData from previous USARIEM studies at Fort Riley, KS and Fort Lewis, WA (65).

protein and carbohydrate. Other topics on which there was limited knowledge included those concerning sources of carbohydrates, B vitamins, and iron. The trainees had some nutrition knowledge because more than 75% of the trainees knew the right answer for questions about the four major food groups, which foods contain protein, the best food choice for reducing weight, and the importance of calcium.

In addition to the multiple choice questions in Table 10, there were seven true/false questions regarding nutrition knowledge. The results on these questions are in Table 11. There is no prior comparison group from an older more experienced sample for these data, because these questions were not asked of those subjects.

Table 11. Additional Nutrition Knowledge of Basic Trainees Based on 7 True/False Questions.

ITEM	% WITH CORRECT ANSWER		
	MALES	FEMALES	TOTAL
Water is essential	100%	97%	98%
Vitamin pills unnecessary	90	96	94
Physical activity requires more calories	80	77	78
Ice cream provides calcium	70	66	67
Fat has more than twice the kcal of carbohydrates	75	61	65
Food labels list ingredients by decreasing quantity	55	66	64
Margarine has same calories as butter	28	28	28

The data in Table 11 indicate that 64% or more of the sample knew the correct answer to every question except one. Only 28% of the overall sample knew the correct answer to the question concerning the similarity of margarine to butter in terms of calories.

The individual scores on the 14 multiple choice questions and the 7 true/false questions were combined into one composite score. This provided a single score for each individual's overall nutrition knowledge on these questions (Table 12). No soldier got fewer than seven questions correct, and no one got all of them correct. Most trainees got slightly over half correct.

Table 12. Distribution of Nutrition Knowledge Scores for Complete Questionnaire.

SCORE	% CORRECT		
	MALES	FEMALES	TOTAL
1-6	0	0	0
7	2.5	0	0.6
8	7.5	0	1.9
9	2.5	4.2	3.8
10	17.5	10.9	12.6
11	10.0	5.9	6.9
12	15.0	13.4	13.8
13	7.5	16.8	14.5
14	15.0	14.3	14.5
15	7.5	8.4	8.2
16	2.5	10.9	8.8
17	5.0	9.2	8.2
18	5.0	1.7	2.5
19	2.5	3.4	3.1
20	0	0.9	0.6
21	0	0	0

In terms of group differences, there was a clear trend towards females getting higher scores (female \bar{x} =13.6, male \bar{x} =12.5). However, the difference between the two genders was not very large. Overall, the total knowledge in this sample of young trainees clearly showed room for improvement. The overall average score was 13.3 out of 21, or 63.3% correct, which would earn a low grade on a typical high school or college grading curve. This suggests that wider implementation of the Nutrition Initiatives will be required to meet the challenge of significantly elevating the nutrition knowledge of soldiers.

Nutritional Practices in the Dining Facility

The basic trainees were asked about some of their eating habits which could be related to nutritional principles (Table 13). The questions were answered on an 8-point answer scale where 0="never," 1="rarely," 4="frequently," and

Table 13. Dietary Practices of Basic Trainees in the Dining Facility.

ITEM	AVERAGE RESPONSE ^a		
	MALES (N=40)	FEMALES (N=119)	TOTAL (N=159)
How Often Do You:			
Choose food based on liking	5.6	5.5	5.5
Use the salad bar	5.0	4.5	4.6
Choose food due to nutrition	4.3	3.7	3.8
Choose food for appearance	4.1	3.4	3.6
Salt food before tasting it	3.7	3.5	3.6
Use the low kcal menu	3.9	3.1	3.3

^aThese questions were answered on an 8-point answer scale where 0="never," 1="rarely," 4="frequently," and 7="always."

7="always" (Appendix H). The results are listed in the table in order of declining frequency, i.e., the dietary practice done most often is listed first, while the one done least is listed last.

As the results in the table indicate, the most common approach to food selection was to choose food based on liking. The average response on this question was 5.5, where 5="very frequently" and 6="almost always." By contrast, food was chosen on the basis of nutrition ($\bar{x}=3.8$), appearance ($\bar{x}=3.6$), or because it was low calorie ($\bar{x}=3.3$) somewhat less than frequently (4="frequently" and 3="occasionally"). This strongly suggests that these trainees select foods for reasons of personal preference more often than for health and nutrition reasons. However, these trainees tended to not salt food before tasting it ($\bar{x}=3.6$), a practice which may have a nutritional or health reason behind it.

In terms of gender differences, there appeared to be a trend for males to choose food for appearance somewhat more often than females did ($\bar{x}=4.1$ vs. $\bar{x}=3.4$). There was also a trend for males to use the low calorie menu slightly more often ($\bar{x}=3.9$ vs. $\bar{x}=3.1$). These were the most pronounced gender differences, although actually, males indicated greater frequency than did females on all of the nutrition practices indicated in this table. The overall implications of this difference are not entirely clear.

Nutritional Beliefs

Basic trainees were asked, in a hypothetical way, about their nutritional beliefs. If nutritional knowledge is defined as awareness of the scientific facts of nutrition, then nutritional beliefs might be defined as personal

assumptions about nutritional topics. The former deals with objective truth, the latter with subjective opinion. In any given case, the two might be related, but there are times when they are not. The questions were phrased in such a way that the troops expressed either agreement or disagreement on a 5-point scale where 1="strongly disagree," 3="neutral or undecided," and 5="strongly agree" (Table 14).

The average response for both of these questions was approximately 3, the neutral or undecided point. These data suggest that a high degree of confusion exists and support the previous contention that nutrition education is needed.

Table 14. Nutritional Beliefs of Basic Trainees.

ITEM	AVERAGE AGREEMENT ^a		
	MALES	FEMALES	TOTAL
Additional salt is important on hot humid days when you're active and perspiring.	2.6	2.7	2.7
To lose weight, it's best to eat fewer carbohydrate foods like bread and pasta.	3.2	3.2	3.2

^aQuestions were answered on a 5-point scale where 1="strongly disagree," 3="neutral or undecided," and 5="strongly agree."

Nutritional beliefs were measured in another manner by asking the trainees to choose the better nutritional selection from a number of pairs of foods (Appendix H). The results are listed in declining order of the percent of the total group making the correct choice (Table 15). The trainees did very well

with a clear majority making the correct decision (the first choice of each pair in this table). The results ranged from a high of 96.2% believing that fresh fruit is a better choice than pastries to a low of 71.7% realizing that margarine is better than butter. However, as noted in the comments for Table 13, simply knowing the wisest nutritional choice does not always affect which foods are actually consumed--personal preference is more likely to have an impact on that food selection.

In terms of gender differences, more females knew the correct answer. The difference was maximal for two items--more females than males knew that herbal seasonings were preferable to salt (92.4% vs. 80.0%) and more females knew that chicken without the skin was better from a nutritional viewpoint (87.4%

Table 15. Percent Making the Correct Nutritional Choice.

ITEM	% CORRECT		
	MALES	FEMALES	TOTAL
Fresh fruit vs. pastries	95.0	96.6	96.2
Unsweetened juice vs. soda	87.5	94.1	92.5
Herbal seasonings vs. salt	80.0	92.4	89.3
Baked vs. fried foods	80.0	91.6	88.7
Low fat vs. whole milk	80.0	89.9	87.4
Chicken without vs. with skin	75.0	87.4	84.3
Margarine vs. butter	67.5	73.1	71.7

vs. 75.0%). These differences suggest that females tend to be more nutritionally aware and have more correct beliefs about nutrition.

In a related set of questions, basic trainees were asked to select the food which would be most beneficial to weight loss. Foods were listed in pairs, with instructions to select the best food of the pair (Appendix H). The results in Table 16 are listed in order of declining percent correct for the overall group. The first choice of the pair is the correct choice in Table 16. Many of these pairs of items were the same as in Table 15, however, the foods were presented in terms of weight loss benefits rather than overall nutrition benefits.

As before, the majority of subjects knew the correct answer for all questions. The overall percent correct ranged from a high of 92.5% to a low of 84.3%. Females again scored somewhat higher on all items tested. The largest gender difference was for the item regarding shredded wheat vs. frosted flakes. For this item, 89.9% of females, but only 75.0% of males, knew the right answer.

Table 16. Percent Making the Correct Food Choices for Weight Loss.

ITEM	% CORRECT		
	MALES	FEMALES	TOTAL
Fresh fruit vs. pastries	90.0	93.3	92.5
Low kcal vs. regular menu	85.0	94.1	91.8
Low kcal vs. regular dressing	82.5	92.4	89.9
Baked vs. fried foods	80.0	91.6	88.7
Potatoes without vs. with gravy	80.0	91.6	88.7
Chicken without vs. with skin	82.5	89.9	88.1
Low fat vs. whole milk	80.0	89.1	86.8
Shredded wheat vs. frosted flakes	75.0	89.9	86.2
Reduced vs. regular portion sizes	82.5	84.9	84.3

While these basic trainees generally knew the correct nutritional and weight loss choices, fewer indicated that they would actually choose that food for consumption if given the choice (Table 17). Again pairs of foods were presented to the trainees with instructions to indicate the food that they would select if they were given the choice (Appendix H). The differences between these results (Table 17) and previous ones were remarkable. While the majority of both males and females knew the correct nutritional (Table 15) and weight loss (Table 16) choices and many wanted to lose weight (Table 8), only half or fewer would make the appropriate food choice when selecting actual foods to eat. For example, 88.7% of the overall group said that potatoes without gravy would be the appropriate choice for losing weight, yet only 30.2% of the overall group said they would actually make that choice. In other words, "knowing" the right thing to do does not guarantee that a person will do it. Again, personal preference more often than nutritional knowledge or beliefs determined actual food selection.

Table 17. Hypothetical Consumption Choices.

ITEM	PERCENT INDICATING THE NUTRITIONAL CHOICE		
	MALES	FEMALES	TOTAL
Fresh fruit vs. pastry	35.0	57.1	51.6
Low fat vs. whole milk	30.0	58.0	50.9
Low kcal vs. high kcal foods	22.5	59.7	50.3
Plain vs. buttered vegetables	32.5	46.2	42.8
Baked vs. fried chicken	27.5	47.1	42.1
Potatoes without vs. with gravy	22.5	32.8	30.2

The gender differences for the hypothetical food choices were even more pronounced than previous ones. As before, females scored higher on every question in terms of the percent stating that they would make the preferred nutritional choice. But rather than the gender differences of about 10-15% shown in Tables 15 and 16, they ranged from about 10 to 37% in Table 17. The largest difference was for the item concerning whether they would choose low calorie vs. high calorie foods. Of the females, 59.7% said they would do so, but only 22.5% of males did, a group difference of 37.2%. Therefore, females indicated a greater willingness to make the appropriate nutritional choices. However, it should be noted that these were hypothetical questions only. The answers do not reflect actual observed choices in the dining facility, but only the subjects' statements about which they would choose in general. It is clearly possible that actual behavior would diverge tremendously from idealized stated behavior. Many people will verbally agree to socially desirable behaviors or behaviors which put them in a favorable light whether or not they would actually engage in those behaviors.

Of course, not all subjects had indicated that they wanted to lose weight, so the data was further analyzed to determine the source of this apparent discrepancy between knowing the right choices for weight loss and not actually making them. As noted on Table 8, 34% of the males and 62% of the females said they were trying to lose weight. Therefore, the total sample was divided into two subgroups, those who said they wanted to lose weight and those who did not. These two groups were compared regarding their responses to the questions cited on Table 16 (items preferable for weight loss) and on Table 17

(items which they would actually choose). Only the five items which appeared on both tables were included in this further analysis.

The results indicated that the two subgroups did not differ in their knowledge of which would be the correct choices for losing weight. Those who wanted to lose weight got 96.9% of those items correct, while those who did not want to lose weight got 96.1% correct. However, the two groups differed significantly ($p < 0.001$) regarding which choices they stated they would actually make. Those wanting to lose weight made the weight loss choice 61.3% of the time, while those not wanting to do so made that choice only 34.5% of the time. In other words, all subjects had approximately the same level of knowledge as to which dietary choices would help them lose weight, and those who wanted to lose weight tended to make those choices far more often than those who did not desire to lose weight.

However, 61.3% is still far from 100%, the subjects who wanted to lose weight were not entirely consistent in making the appropriate choices. And it must be remembered that these results reflect only a verbal indication that they would make these relevant choices--actual eating behavior was not measured in this instance.

History of Meal Habits Prior to Basic Training

One of the many adjustments to military life for basic trainees is the change in normal meal habits. During basic training, attendance at meals is mandatory. Responses to questions concerning meal habits prior to basic training indicated that these trainees were not accustomed to eating the traditional three meals per day (breakfast, lunch, dinner) (Table 18).

Table 18. Meal Patterns of Male and Female Basic Trainees Prior to Basic Training.

STATEMENTS	GENDER	FREQUENCY OF RESPONSE			
		DAILY	3-5 DAYS/WK	<3 DAYS/WK	RARELY
Ate at least 2 well balanced meals	Male (N=126)	47(37%)	43(34%)	23(18%)	13(11%)
	Female (N=130)	50(38%)	28(21%)	36(27%)	16(12%)
Usually ate Breakfast	Male (N=126)	46(36%)	20(16%)	19(15%)	41(33%)
	Female (N=129)	37(29%)	21(16%)	30(23%)	41(32%)
Usually ate Lunch	Male (N=126)	77(62%)	27(21%)	14(11%)	8(6%)
	Female (N=129)	64(50%)	28(22%)	25(19%)	12(9%)
Usually ate Dinner	Male (N=126)	105(84%)	18(14%)	3(2%)	0(0%) #
	Female (N=129)	89(69%)	25(19%)	12(9%)	3(2%)

#=Significant at $p < 0.05$ level

Thirty-seven percent of the males and 38% of the females ate at least 2 well-balanced meals daily, while only 11% of the male basic trainees and 12% of the female basic trainees reported that they rarely/never ate two well-balanced meals per day prior to basic training. Results obtained from the Army Health Risk Appraisal Program (HRA) indicated that a larger percentage of the soldiers who had been in the Army for long periods of time rarely/never ate two well-balanced meals/day. A significant difference in the frequency with which well-balanced meals were eaten was not found between genders.

The frequency with which males and females ate each of the traditional meals (breakfast, lunch, dinner) prior to basic training was similar for breakfast and lunch but a significant difference ($p < 0.05$) was found for the dinner meal. Males tended to eat this meal with greater frequency than

females. In comparison with the other 2 meals, the breakfast meal was less likely to be eaten by males and females on a daily basis (males 36%, females 29%) and a larger percentage of males and females also stated that the breakfast meal was rarely or never eaten (33% and 32%, respectively). Dinner was the meal most likely to be eaten on a daily basis by both males and females (84% and 69%) prior to basic training.

Basic trainees were asked to indicate the primary type of cooking that they were raised on, since background may markedly affect the perceptions of standard military food. The results (Table 19) are listed in descending order of response frequency for the total group. Cooking types not reported by at least one percent of the sample were combined under the "Other" category. Not surprisingly, the general American style of cooking accounted for over half of the total sample. Adding the regional variants, the Southern and New England style, to the General American style accounted for almost two-thirds of the responses of basic trainees (65.4%). Soul food accounted for another 18.2% of the responses, while the remainder of the responses were spread among a variety of cultural styles. In terms of gender differences, males were more likely to indicate soul food, while females were more likely to cite the general American style as the type of cooking they were raised on.

Subjects were asked where they typically ate the three basic daily meals before joining the military. The results for the sample are presented in Table 20. Since no apparent gender differences were noted, the results were pooled together. Prior to joining the Army, the majority of subjects ate breakfast and dinner at home. Less than half (42.1%) ate lunch at home while

over a third (34.6%) ate at a club, restaurant, or snack shop. Many subjects skipped at least one meal, with 31.4% missing breakfast, 5.7% missing lunch,

Table 19. Type of Cooking Raised On.

TYPE	PERCENT OF EACH GROUP INDICATING		
	MALES (N=40)	FEMALES (N=119)	TOTAL (N=159)
General American Style	35.0	58.8	52.8
Soul Food	32.5	13.4	18.2
Southern Style	12.5	10.1	10.7
English	2.5	5.0	4.4
Mexican	2.5	4.2	3.8
Spanish (not Mexican)	7.5	1.7	3.1
New England Style	2.5	1.7	1.9
Italian	--	1.7	1.3
All other	5.0	3.4	3.8

Table 20. Location of Meals Before Military Service.

LOCATION	PERCENT OF TOTAL SAMPLE INDICATING EACH CHOICE		
	BREAKFAST (N=159)	LUNCH (N=159)	DINNER (N=159)
Private residence	55.5	42.1	73.6
Club/restaurant/snack shop	8.8	34.6	18.9
Dormitory	3.1	5.0	3.1
Vending machine	0.6	10.1	1.3
Mobile truck	0.6	1.3	--
Other	--	1.2	--
Skipped the meal	31.4	5.7	3.1

and 3.1% skipping dinner. That adds up to a total of 40.2% of subjects missing a meal in any given day, assuming that no subject indicated more than one meal a day being skipped. These figures agree closely with the data reported in Table 18, but they differ slightly because the data in Table 20 are from a subsample of all subjects in this study and because of the phrasing of the questions.

History of Food Consumption Patterns

Prior dietary patterns of basic trainees were obtained through questions concerning the frequency with which groups of foods were eaten, their preference for foods prepared by different methods, and the frequency with which specific foods were consumed (e.g., milk, eggs). In retrospect, questions concerning the frequency with which dessert items (e.g., cakes, pies, cookies) and other high calorie items (sweet rolls, donuts) were eaten, should have been included. Future studies should include questions assessing the subject's role in menu planning, food purchasing, and food preparation at home.

Overall, males and females did not differ significantly in the frequency with which foods from most groups were consumed. Two exceptions were the frequency with which high fat meats and high fat, high sodium meats were eaten (Table 21). High fat (red) meats were consumed by males on a daily basis more often than by females (males 54%, females 39%). A greater percentage of females indicated that they rarely/never consumed red meats (males 0%, females 8%). A greater percentage of the females also reported that they rarely or never ate high fat, high sodium meats (males 9%, females

Table 21. Consumption of Different Foods Prior to Basic Training
Reported By U.S. Army Basic Trainees.

FOODS	GENDER	FREQUENCY OF RESPONSE			
		DAILY	3-5 DAYS/WK	<3 DAYS/WK	RARELY
High Fat Meats (Red Meats)	Male (N=128)	69(54%)	41(32%)	18(14%)	0 (0%) #
	Female (N=130)	51(39%)	41(32%)	28(21%)	10 (8%)
Lower Fat Meats (Fish, Fowl)	Male (N=128)	18(14%)	40(31%)	62(49%)	8 (6%)
	Female (N=130)	23(18%)	55(42%)	46(35%)	6 (5%)
High Fat Dairy Products	Male (N=128)	70(55%)	33(25%)	19(15%)	6 (5%)
	Female (N=130)	61(47%)	45(34%)	18(14%)	6 (5%)
Legumes	Male (N=126)	8(6%)	26(21%)	42(33%)	50(40%)
	Female (N=130)	8(6%)	17(13%)	49(38%)	56(43%)
Whole Grains, Cereals, Rice	Male (N=127)	56(44%)	34(27%)	28(22%)	9 (7%)
	Female (N=130)	43(33%)	46(35%)	35(27%)	6 (5%)
Raw Fruit, Vegetables	Male (N=127)	28(22%)	39(31%)	42(33%)	18(14%)
	Female (N=130)	46(35%)	34(26%)	36(28%)	14(11%)
High Fat, High Na Meats	Male (N=127)	23(18%)	33(26%)	59(47%)	12 (9%) #
	Female (N=130)	17(13%)	31(24%)	53(41%)	29(22%)
High Fat, High Na Snacks	Male (N=128)	39(31%)	42(33%)	33(26%)	14(11%)
	Female (N=130)	32(25%)	33(25%)	44(34%)	21(16%)

#=Significant at $p < 0.05$ level

22%) while daily consumption of these foods was reported by 18% of the males and 13% of the females.

Prior to basic training, both males and females reported the frequency of consumption of red meats to be greater than for fish or fowl. Red meats were consumed daily or 3-5 days/week by 86% of the males and 71% of the females.

The frequency for consumption of fish or fowl was 45% for males and 60% for females at these same rates.

Daily consumption of high fat dairy products (butter, whole milk, cheese, and/or ice cream) was reported by 55% of the males and 47% of the females, making these foods the most frequently consumed foods on a daily basis; however, consumption of high fat meats was nearly as high for males. These high fat dairy products were reported as rarely/or never eaten by only 5% of both genders.

The high fiber legumes (beans) were the least likely foods to be consumed on a daily or 3-5 days/week basis (males 27%, females 19%). These foods were rarely/never eaten by 40% of the males and 43% of the females. Raw fruit or vegetable consumption on a daily basis was greater for females than males (35% vs. 22%), although no significant difference was found between genders when comparing overall consumption patterns. A greater preference for these foods by females has been previously reported (73).

Prior to basic training the consumption of high fat, high sodium snacks was rather high for this sample of trainees. These snacks were consumed by 64% of the males and 50% of the females at rates exceeding 3-5 days/week.

The popularity of fried foods in the U.S. has been documented (74). Unfortunately, this method of food preparation (especially deep fat frying) significantly increases the fat content of menu items. When asked whether more fried than baked chicken, fish, or potatoes were eaten prior to basic training (Appendix F), results indicated that the majority of males and females ate more fried foods (Table 22). Fried chicken was consumed most often, with 56% of the males and 52% of the females preferring this method of

preparation. Only 17% of the males and 22% of the females said that baked chicken was eaten more frequently; whereas 23% of both males and females reported that they consumed both fried and baked chicken with equal frequency.

Table 22. Preference for Fried Foods Prior to Basic Training as Reported by U.S. Army Basic Trainees.

FOOD	GENDER	FREQUENCY OF RESPONSE			
		DON'T EAT THIS FOOD	YES	NO	EVEN
Ate More Fried Chicken than Baked	Male (N=128)	5 (4%)	72(56%)	22(17%)	29(23%)
	Female (N=130)	4 (3%)	68(52%)	28(22%)	30(23%)
Ate More Baked Fish than Fried	Male (N=126)	15(12%)	14(11%)	56(44%)	41(33%) #
	Female (N=130)	20(16%)	30(23%)	53(41%)	26(20%)
Ate More French Fries than Baked Potatoes	Male (N=128)	2 (1%)	77(60%)	20(16%)	29(23%) #
	Female (N=130)	4 (3%)	52(40%)	44(34%)	30(23%)

#=Significant at $p < 0.05$ level

While no significant differences were found between males and females for fried/baked chicken consumption, a significant difference ($p < 0.05$) was found between males and females in consumption of fried/baked/boiled potatoes and fried/baked fish. Of the three foods (chicken, fish, potatoes), fish was the least popular item with 12% of the males and 16% of the females not eating fish. About 44% of the males and 41% of the females responded that they ate more fried fish. Gender differences were noted in the consumption of french

fried potatoes versus baked/boiled potatoes. When potatoes were eaten, french fried potatoes were chosen more frequently by males (males 60%, females 40%). Baked/boiled potatoes were eaten more often by 34% of the females.

After the 1985 nutrition initiatives were implemented, the service of 2% low fat milk instead of whole milk was one of the first changes to take place. Monitoring milk consumption is important not only for determining the effects that dairy products have on fat intakes, but also on calcium intakes. For these reasons, basic trainees were specifically asked about their past milk consumption habits (Tables 23-24).

Table 23. Milk Consumption in an Average Day Prior to Basic Training as Reported by U.S. Army Basic Trainees.

GENDER	GLASSES PER DAY					
	0	1/2	1	1 1/2	2	>2
Male (N=128)	12 (9%)	11 (9%)	23(18%)	16(13%)	22(17%)	44(34%) #
Female (N=130)	27(21%)	17(13%)	30(23%)	10 (8%)	25(19%)	21(16%)

#=Significant at $p<0.05$ level

As expected males and females drank significantly different ($p<0.05$) amounts of milk (Table 23). More females than males reported drinking no milk in an average day (males 9%, females 21%). Milk consumption of more than 2 glasses/day was reported by fewer females than males (males 34%, females 16%).

Table 24. Types of Milk Consumed Prior to Basic Training as Reported by U.S. Army Basic Trainees.

GENDER	TYPE OF MILK				
	NO MILK	WHOLE	LOW FAT	SKIM	CHOCOLATE
Male (N=128)	4 (3%)	67(52%)	41(32%)	6 (5%)	10 (8%) #
Female (N=129)	13(10%)	48(37%)	46(36%)	14(11%)	8 (6%)

#=Significant at $p < 0.05$ level

A significant difference ($p < 0.05$) was noted between males and females for the usual type of milk consumed prior to basic training (Table 24). While almost equal percentages of males (32%) and females (36%) reported usually drinking low fat milk, differences were found for whole, skim, and no milk consumption. Whole milk was drunk by 52% of the males and 37% of the females, while skim milk was drunk by 5% of the males and 11% of the females. Data were not available to determine whether the differences in whole and skim milk consumption were due to attempts to lose weight, nutritional beliefs about CHD, or preferences. In Table 24 a greater percentage of the females (10%) than males (3%) reported not usually drinking any milk at all. The number of subjects not drinking milk in Table 23 is different from that in Table 24 because the questions in Table 23 were phrased to obtain information on daily milk consumption and many subjects answered that they did not drink milk daily. In Table 24 the questions were phrased to catch the trainees who drank milk infrequently and therefore the information on subjects that do not drink milk is more representative of people who never drink milk at all due to allergies, etc.

Eggs have been shown to be the most significant source of dietary cholesterol in the Army diet (6,51,52). Basic trainees were asked to report the average number of visible eggs eaten per week prior to basic training. Significant differences were noted between the genders (Table 25). Almost twice as many males as females reported eating more than 4 eggs/week (males 59%, females 34%). Consumption of more than 10 eggs per week was reported by 9% of the males but by only 1% of the females. A comparison to actual egg consumption during basic training will be discussed later.

Table 25. Number of Visible Eggs Eaten per Week Prior to Basic Training as Reported by U.S. Army Basic Trainees.

GENDER	NUMBER OF EGGS					
	0	1-2	3	4-6	7-10	>10
Male (N=127)	10 (8%)	25(20%)	17(13%)	44(35%)	19(15%)	12 (9%) #
Female (N=130)	26(20%)	42(32%)	18(14%)	35(27%)	8 (6%)	1 (1%)

#=Significant at $p < 0.05$ level

Basic trainees were asked about their current attitudes toward salt and sugar (Table 26). On an 8-point answer scale where 4="neither important nor unimportant" to their enjoyment of food, females averaged 4.2 for both salt and sugar. Males averaged around 5, which indicated that salt and sugar were "slightly important" to their enjoyment of food.

Table 26. Attitude of Basic Trainees Toward Condiment Use.

ITEM	AVERAGE IMPORTANCE OF ITEM TO FOOD ENJOYMENT ^a		
	MALES	FEMALES	TOTAL
Salt	4.7	4.2	4.3
Sugar	5.0	4.2	4.4

^aThese items were rated on an 8-point scale in which 0="not at all important," 1="very unimportant," 4="neither," and 7="very important."

Characteristics of the Dining Facility

The consolidated dining facility where data were collected was typical of other basic trainee dining facilities on post. At Fort Jackson, a civilian food service corporation was responsible for the operation of all basic trainee dining facilities. This particular dining facility was responsible for the preparation of all the food consumed by one training battalion (trainees and cadre), whether in garrison or at field training sites.

The physical layout of the dining facility included two separate but connected dining areas with a total seating capacity of approximately 420 persons. Males ate separately from females, although one male company entered the dining facility from the female side. Four hot food serving lines (two per side) and two cold food serving lines (one per side) were used during service at each meal.

Although the civilian contractor was responsible for the majority of the food preparation functions, military personnel did play a significant role in other food service operations. Basic trainees, detailed as kitchen police workers (KPs), were responsible for the service of food, dish and warewashing,

sanitation, and some food preparation. A military supervisor was responsible for the overall supervision of the KPs. Dining facility managers provided KPs with portion size and serving utensil instructions prior to each meal. Head count duties were performed by drill instructors on a rotating schedule. The constant turnover of military personnel and their unfamiliarity with their duties probably impacted adversely on the speed of service, the time that trainees had to eat, and on the standardization of portion sizes.

Compartmentalized trays were used for food service at both the dining facility and field feeding sites. Glasses or mugs were picked up prior to entering the dining facility. As the basic trainees entered the dining facility, each was required to drink one glass of water as a preventative measure against heat injury. Only one glass or mug was allowed per trainee. The glass and mug held equal volumes of fluid (~10 oz when filled to capacity). Canteen cups were used to hold beverages in the field when MRE meals were served.

This style of service differed from previous dining facility studies where standard dining facility trays, china, and glassware were used. Since subjects were allowed only one beverage container, consumption patterns (both quantity and variety) may have been different from previous studies where more than one glass or mug had been allowed. However, the effect of this factor on beverage consumption is unknown and cannot be estimated.

Characteristics of Basic Trainee Meal Periods

Basic trainees consumed meals under significantly different conditions than did soldiers from previous USARIEM studies (6,51,52,75) eating at other garrison dining facilities. Among these differences were:

1. Attendance at all meals was mandatory for basic trainees, while soldiers in previous USARIEM studies generally had a freedom of choice.
2. Basic trainees marched to all meals as units whereas soldiers in other studies arrived independently. This resulted in longer waits for the trainees to sign the head count roster (Basic Trainees 10-15 min average wait, other observed soldiers from Study IV <1 min).
3. Basic trainees were discouraged from socializing during the meal period while other observed soldiers used the meal period for socialization, relaxation, as well as food consumption.
4. Basic trainees at this facility were given approximately one half hour to sign the head count roster, select foods, and consume meals. In a previous dining facility study (Study IV) other soldiers were given longer meal periods: 60 minutes or longer for 75% of the sample, 45 min for 10% of the sample, and 30 min or less for 14% of the sample.

A comparison of the length of time that these basic trainees were given and/or took to select and consume meals was made with preliminary data from soldiers in Study IV eating under normal dining facility conditions (Table 27). Since this basic trainee dining facility was a consolidated dining facility feeding six companies, results obtained from a company level dining facility may differ. The extent of these differences is not known. The dining facility used for comparison also was a consolidated dining facility; however, the average census for the dining facility in Study IV was 300 meals compared to the 1200 meals served at the basic trainee dining facility (75).

The average time taken to select meals was similar for the two groups (Table 27). However, the ranges of selection times were different, with the

range for basic trainees about 5 minutes greater at breakfast and 12 minutes greater at dinner. These differences may have occurred because of differences in physical layouts, experience of food servers (inexperienced KPs vs. experienced military cooks), difficulties with traffic flow, and different head count systems used by various drill instructors. The greater time range

Table 27. Comparison of Average Selection and Consumption Times for Basic Trainees and Other U.S. Soldiers.

GROUP	AVERAGE SELECTION TIMES (min) ^a					
	BREAKFAST RANGE		LUNCH RANGE		DINNER RANGE	
Basic Trainees	4	9	5	12	6	19
Other Soldiers ^b	4	4	4	4	5	7

	AVERAGE CONSUMPTION TIMES (min) ^a					
Basic Trainees	10	18	12	21	12	18
Other Soldiers	16	33	19	60	19	80

^aTimes have been rounded to the nearest minute.

^bPreliminary data for Other Soldiers obtained from Study IV (Fort Devens II) (75).

was not attributable to differences in selection times of individual trainees since they were moved through the serving lines as fast as possible.

The average time spent consuming a meal was greater for other soldiers than for basic trainees (Table 27). Other soldiers took an average of 6 min

longer at breakfast and 7 min longer at lunch and dinner to eat their meals. These differences were probably due to the absence of socialization and relaxation during basic trainee meal periods. The wide ranges of consumption times for other soldiers support this theory (33 min for breakfast, 60 min for lunch, 80 min for dinner). Even though the average time allowed for consumption of food was very short, the basic trainees were allowed sufficient time to consume enough food to meet or exceed the requirements of the MRDA (See upcoming section on Nutritional Adequacy). It appears that the trainees are receiving enough time to eat, but they do not have time to socialize or relax at meals.

Dining Facility Evaluation

The participants in this study were asked to evaluate their dining facility. They were asked to rate 12 possible problem areas using a 5-point rating scale, where 1="significant problem," 2="minor problem," 3="neither problem nor attraction," 4="minor attraction," and 5="significant attraction." The results are in Table 28, with the 12 possible problem areas ranked in order from most positive to least positive according to the ratings of the total sample.

Five of the twelve possible problem areas received average evaluations on the positive side of the scale, while seven received negative ratings. The most positive was the appearance of the dining area ($\bar{x}=3.59$), followed in order by the dining facility environment ($\bar{x}=3.48$), air quality ($\bar{x}=3.33$), convenience of the location ($\bar{x}=3.05$), and the dining hall staff ($\bar{x}=3.04$).

These positive evaluations were concerned with the physical nature of the facility itself.

The area receiving the lowest evaluation was the length of time allotted for meals ($\bar{x}=1.72$). Other problems, in order of decreasing severity, were the speed of service or waiting lines ($\bar{x}=2.16$), the quantity of food

Table 28. Evaluation of the Basic Trainee Dining Facility.

TOPIC	AVERAGE RANKING ^a BY THE GIVEN GROUP		
	MALES (N=40)	FEMALES (N=119)	TOTAL (N=159)
Dining area appearance	3.38	3.72	3.59
Dining facility environment	3.61	3.32	3.48
Air quality	3.20	3.37	3.33
Convenience of location	3.35	2.95	3.05
Dining hall staff	3.05	3.03	3.04
Number of available seats	2.88	2.89	2.89
Number of items per meal	2.58	2.90	2.81
Monotony of same facility	3.10	2.70	2.80
Quality of food	3.10	2.67	2.78
Quantity of food	2.00	2.34	2.25
Speed of service or waiting lines	2.40	2.08	2.16
Length of time allotted for meals	1.93	1.64	1.72

^aNumbers refer to a 5-point scale where 1="significant problem," 2="minor problem," 3="neither problem nor attraction," 4="minor attraction," and 5="significant attraction."

($\bar{x}=2.25$), the quality of food ($\bar{x}=2.78$), monotony of the same facility ($\bar{x}=2.80$), the number of items per meal ($\bar{x}=2.81$), and the number of available seats ($\bar{x}=2.89$). These negative evaluations were concerned mostly with the food itself and the various factors which restricted the time that the basic

trainees had to be served and to eat. Overall, evaluations of the physical attributes of the dining facility were fairly positive, while ratings of the food and the ability to feed the trainees in the time allotted were somewhat negative. Both males and females tended to rate the same items similarly with no major discrepancies in ratings by gender.

Another aspect of this study required survey respondents to evaluate the effectiveness of calorie cards in the dining facility as well as other health and nutrition topics. The intent of the calorie cards is to provide information about the menu items on the serving line. They are color coded with green cards indicating that an item is healthy and nutritious, yellow indicates caution should be used, and red means that the item may be high in calories, fat, and/or sodium. If the system is used as planned, then the serving line should move faster because soldiers can quickly identify the more nutritious items marked with green cards. The results are in Table 29. These questions were answered on a 5-point scale where 1="strongly disagree," 3="neutral or undecided," and 5="strongly agree." Few of the mean scores were markedly different from the neutral point of 3. Regarding the calorie cards, the average response indicated mild agreement with the idea that the calorie cards helped in selecting nutritious and low calorie foods. There was disagreement, however, with the statement that these calorie cards helped decrease time spent in line waiting to be served.

On the average the trainees agreed somewhat that the dining facility food was healthful, was as nutritious as restaurant food, provided as many low calorie options as foods eaten at home or in restaurants, and helped overweight personnel lose weight. However, subjects also agreed slightly

Table 29. Evaluation of Attitudes Toward Nutrition Information.

ITEM	MEAN SCORE ^a AS RATED BY		
	MALES	FEMALES	TOTAL
The "calorie cards" help me:			
Select nutritious food	3.2	3.3	3.3
Select low calorie food	3.5	3.7	3.6
Decrease time in line	2.6	2.6	2.6
The current dining hall food:			
Provides a healthful diet	3.5	3.6	3.5
Helps the overweight lose weight	3.9	3.2	3.4
Tastes bland	3.1	3.5	3.4
Is as nutritious as in restaurants	3.3	3.2	3.3
Helps me find a low calorie meal as easily as at home/restaurant	3.3	3.2	3.3
Tastes salty	2.2	1.8	1.9
Nutrition info before joining military:			
Influenced food choices at home and restaurants	2.9	3.2	3.1
Increased awareness of nutrition	3.5	3.5	3.5
Improved attitude toward nutrition	3.6	3.6	3.6
The Army supplies nutritional information			
To help us choose nutritious food	3.7	3.8	3.8
To help us reach optimal weight	3.6	3.7	3.7
Proper nutrition:			
Is important to overall health	4.3	4.6	4.5
Is important to overall fitness	4.1	4.5	4.4

^aThese questions were answered on a 5-point scale where 1="strongly disagree," 3="neutral or undecided," and 5="strongly agree."

that the food tasted bland and disagreed with the statement that it tasted salty.

The basic trainees agreed somewhat that nutrition knowledge gained prior to joining the Army increased their awareness of proper nutrition and

improved their attitude toward proper nutrition. However, they were essentially neutral ($\bar{x}=3.1$) on the question pertaining to whether such knowledge had influenced their actual food choices at restaurants and at home.

The trainees clearly agreed that the Army's purpose in supplying nutrition information was to help them choose more nutritious foods and help them reach and maintain optimal body weights. Finally, they agreed quite strongly that proper nutrition was important to overall health ($\bar{x}=4.5$) and fitness ($\bar{x}=4.4$). For the most part, both males and females tended to agree on these items. As discussed before, the basic trainees were aware of the importance of proper nutrition but they were neutral on applying these principles to their food choices.

A Comparison of the Army Master Menu with the Study Menu

Menu planning in the U.S. Army is associated with the Master Menu, SB 10-260 (4). This supply bulletin is published quarterly by the Department of the Army (DA). The basic format includes a 30-day cycle of menus with a standard short order menu and daily a la carte breakfast menus. The basic patterns for a breakfast meal, standard short order meal, and lunch/dinner meal from the Master Menu are provided in Figure 2. Daily adjustments are made to the standard short order menu and daily a la carte breakfast menu to provide variations in items such as hot cereals, breakfast meats, hot breads, fruits/juices, soups, sandwiches, and salads/salad dressings. Specialty or ethnic menus are provided for holidays or special events which may fall within the specified menu quarter. The Master Menu also includes nutrition

Figure 2. Menu Patterns For a Master Menu A La Carte Breakfast, Short Order Meal, and Lunch/Dinner Meal

BREAKFAST

- *Chilled Fruit or Juice
- Ready-to-Eat Cereals
- *Hot Cereal or Potatoes
- Eggs to Order
- Pancakes w/Hot Maple Syrup
- French Toast w/Hot Maple Syrup
- *Breakfast Meats
- *Special Hot Breads
- Toast-Margarine
- Jam or Jelly
- Low fat (2%) Milk
- Tea-Coffee

*These foods are specified on the daily breakfast menu

LUNCH/DINNER

- Soup/accompaniment
- Entrees (choice of two)
- Starches (choice of one or two depending upon entree)
- Vegetables (choice of two)
- Salads (choice of two)
- Low Calorie Salad Dressing
- Baked Desserts (one)
- Canned or Fresh Fruit (one)
- Breads or Hot Breads
- Milk, Low Fat (2%)
- Soft Drinks
- Tea-Coffee

SHORT ORDER

- *Soup w/ Crackers
- Hamburgers/Cheeseburgers w/ Roll
- Frankfurters w/ Roll
- *Special of the Day
- Catsup, Mustard, Pickle Relish, Chopped Onions
- French Fried Potatoes
- *Salads and Salad Dressing
- *Desserts/Fruit
- *Beverages

*Specified on the daily short order meal menu

information, subsistence procurement data, menu patterns for a fitness menu (reduced calorie), and suggestions for variations in types of service offered by dining facilities.

Prior to the 1970s, the Master Menu reflected the menu items served in every Army dining facility for any given meal on any given day. Today, the Master Menu is used as a guide rather than as doctrine. These changes were made to allow local dining facility managers and installation food advisors greater flexibility in planning a menu to meet specific local requirements and food availability (5).

The 1985 nutrition initiatives changed the Master Menu in the following manner:

1. a reduction in the frequency with which red meats, gravies and other high fat sauces, deep fried menu items, and high calorie dessert items were offered;
2. an increase in the frequency with which fish, poultry, and fruits were offered; and
3. the addition of low fat (2%) milk, low calorie salad dressings, and herb mixtures to the menu (4).

The Master Menu offers a choice between margarine or butter but states that Commodity Credit Corporation butter will be used when available (4).

Instructions in Appendix J of AR 30-1 suggest that margarine should be available to military diners (5).

The Breakfast Fitness Bar is a recent addition to the food service variations suggested in the Master Menu. Where possible, dining facility managers are encouraged to add this service to the normal a la carte breakfast. This self-service variation is suggested so that the military

diner will have lower calorie, lower fat, higher fiber menu alternatives available at breakfast. A suggested list of foods which may be offered includes: non-sugar coated, whole grain ready-to-eat cereals; hot whole-grain cereals; fresh, frozen, dried, and/or canned fruits; unsweetened fruit juices; low fat yogurt; low fat cheeses; low fat (2%) and skim milks; and whole grain bread products (4).

Although dining facility managers have been given menu planning flexibility, menus must still conform to the nutritional standards provided in AR 40-25 and Appendix J of The Army Food Service Program (AR 30-1) (4,5,47). Previous USARIEM dining facility studies reported that the Master Menu was used as a guide for local menu preparation in two military-operated dining facilities. In a contractor-operated dining facility, the Master Menu was not used. Nutrient intake data did not appear significantly different in these dining facilities (6,51,52).

Menu writing at Fort Jackson was the responsibility of each contract dining facility manager for his/her assigned dining facility. Although daily variations in specific menu items occurred between dining facilities, overall patterns and type of foods offered were similar for all dining facilities. Menus were written in compliance with all regulatory and contractual requirements as well as to meet the approval of the installation menu board. The menus reflected the desires of troop commanders, although these requests were subject to the same approval processes.

The dining facility and field menus used during the data collection phase of this study were based on the Master Menu, Contractor standard operating procedures (SOPs), and other local procedures. These menus are provided in

Appendices K and L. The general menu pattern was similar to the standard breakfast, lunch, and dinner menu patterns identified in the Master Menu with the following exceptions:

1. Soup was not offered at any meal;
2. A sweet baked dessert was offered only at the lunch meal;
3. A greater number of salads were offered;
4. Fresh fruits were available at every meal;
5. Regular as well as low calorie salad dressings were offered;
6. Hot breads were not available at any meal; and
7. Gravies were offered at almost every lunch/dinner meal.

Other menu and/or procedural differences were noted between this basic trainee dining facility and previously studied dining facilities (6,51,52). No standard short order menu was offered to these basic trainees. Absence of a short order menu removed many popular foods which are major sources of fat and saturated fat. Although salads were presented according to a salad bar concept, salad items were controlled by servers. Previous dining facilities had self-service salad bars which allowed soldiers greater access to high calorie, high fat items such as eggs, olives, salad dressings, etc. (6,51,52).

A modified breakfast fitness bar was offered at this dining facility. These menu items were self-service and included low fat yogurt, raisins, cottage cheese, and canned fruits. Low fat yogurt also was served at the lunch and dinner meals. The location of the breakfast bar at the end of the cold serving line, out of the main traffic flow, may have reduced its usage.

A direct comparison of the entrees listed on the Master Menu with those listed on the dining facility menu indicated that the Master Menu was indeed used as a guide during menu preparation. Identical entrees appeared fifty percent of the time and many of the remaining entrees used similar types of meats (Chili vs. Meat Sauce, Baked Turkey vs. Turkey Cutlet, etc.).

The results of the study menu analysis are presented in Appendix M. Generally, the dining facility and field menus provided sufficient nutrients to meet or exceed the guidelines provided in AR 40-25. Field menus were deficient in available calcium due to the local stipulation that dairy products or menu items containing dairy products would not be sent to the field.

A direct comparison of the average available nutrients provided by the Master Menu and study menu could not be made. Although methods used to analyze the two menus were similar, the mix of foods used was entirely different. For instance, the Master Menu analysis reflected the use of only low calorie salad dressings at all meals, while the study menu analysis included both regular and low calorie dressings. The Master Menu analysis did not reflect the numerous salads offered at Fort Jackson and did not take into consideration the consumption of soft drinks.

Menu analysis techniques should be further developed and standardized at USARIEM. Although this tool has limited value in predicting actual dietary intakes, its use provides a better understanding of the overall dining facility operation. With this better understanding, a comparison of the results obtained from different dining facility studies would be facilitated. However, before this can happen, decisions concerning the items to be

included, the appropriate serving size, and the use of observed recipe data in the analysis need to be made.

Dietary Intake Analysis

The nutrient content of the diets consumed by the subsample of forty-one male and forty female basic trainees was determined by collecting food intake and food preparation data for seven days. Recipe and nutritional analyses were performed using an automated data base (see Methods section). A comparison of the nutrient content of those observed recipes which were prepared more than once revealed several major differences. These differences were the result of available ingredients, recipe extension problems, and the preparation techniques utilized by different dining facility cooks. Major differences in recipe preparation had been noted in previous USARIEM dining facility studies although these data have not been fully analyzed or previously reported. Complete results of this recipe comparison are presented and discussed in Appendix N.

A visual estimation method utilizing trained data collectors collected 96% of the data (Table 30). Dietary intake was obtained by dietary recall for another 2% of the data. When food intake information could not be obtained from a test subject by any of the above methods, the missing nutrients values were replaced by calculated means for similar meals from that subject's data.

Field Feeding

These basic trainees did not eat all of their meals in the dining facility because the time required to transport troops back to the dining facility

Table 30. Number of Meals Collected at Breakfast, Lunch, Dinner per Data Collection Site (Method).

DATA COLLECTION SITE (METHOD)	MALE			FEMALE			TOTAL	
	B	L	D	B	L	D	(N)	(%) ^a
Facility	253	188	266	277	138	257	1379	81%
Field	28	67	18	0	131	17	261	15%
MRE	0	19	0	0	0	0	19	1%
Other	0	2	0	0	1	0	3	<1%
Missing	6	11	3	3	10	6	39	2%
Total	287	287	287	280	280	280	1701	100%

^aPercentages have been rounded to the nearest whole number and therefore may not add up to 100%.

would have adversely affected the training schedule. Food was served in the field as well as in the dining facility for 16 of the 21 meals. Commanders also were given the option of serving the MRE operational ration instead of the Army A-ration (food prepared by the dining facility). The MREs eaten at 2 meals in the field accounted for only 1% of the total number of meals consumed during the study. The commanders appeared to use MREs very seldom during basic training.

A-ration menus served in the field were generally the same as those served in the dining facility. However, fewer foods were available in the field (Appendixes K and L), because local restrictions prohibited the use of dairy products, foods combined with dairy products, and fish in the field. As a result of the milk restriction, dry ready-to-eat cereals were not offered at breakfast meals in the field. Food safety was the reason most often cited for these restrictions.

The results of the dietary intake analysis of 14 A-ration meals consumed in the field are presented in Appendix O and the analysis of 2 meals of MREs in Appendix P. A significant difference ($p < 0.05$) was determined for the energy (kcal) intake between dining facility and field meals at 7 of the 14 A-ration meals served in the field (Appendix O, Table O-1). Overall, energy intakes were lower in the field than in the dining facility. At the two meals where energy intakes were approximately the same for the field and the dining facility meals, a higher percentage of soldiers in the field were selecting the higher calorie meat items, which raised their energy intakes. The frequency with which menu items were selected at all dining facility and field meals are presented in Appendix Q.

Significant differences between the energy intakes of meals eaten in the dining facility and field were due to three major factors. First, the total number of available foods was lower in the field. Second, dairy products (milk and cheese) were not served in the field. And third, portion sizes served in the field were generally smaller, since the food delivered to the field had to be "stretched" to feed everyone. This does not necessarily mean that sufficient food was not sent to the field, but that emphasis was placed on control of portion sizes to ensure that the individuals at the end of the serving line would have food. Soldiers were allowed to have second servings if any food was left after everyone had been served.

Plate Waste

Results of the study menu analysis indicated that the dining facility was providing more than adequate amounts of all nutrients; however, providing

well-balanced meals does not ensure that the foods ultimately selected and eaten will be nutritionally adequate. Although plate waste may occur for a variety of reasons, extensive plate waste may, in part, explain inadequate nutrient intakes (i.e., nutrient intakes below the MRDA). Therefore, the nutritional content of foods served to, but not eaten by the basic trainees (plate waste) was analyzed by two different methods. One method involved calculating the mean nutrient content of the plate waste. The other method yielded the nutrient value from plate waste as a percent of the total nutrients selected (Table 31).

Table 31. Analysis of Plate Waste for Selected Nutrients for Seven Days.

NUTRIENT	BREAKFAST		LUNCH		DINNER	
	MEAN±SD	%TOTAL	MEAN±SD	%TOTAL	MEAN±SD	%TOTAL
MALES						
Energy (kcal)	240±226	3%	199±202	2%	235±191	3%
Protein (g)	8±8	3%	8±12	2%	7±12	2%
Fat (g)	8±11	3%	8±10	2%	7±8	3%
Carbohydrate (g)	36±36	3%	26±24	3%	32±24	3%
Cholesterol (mg)	99±210	3%	31±21	2%	30±40	2%
Iron (mg)	2±3	3%	2±2	3%	2±2	3%
Sodium (mg)	373±436	3%	421±546	2%	550±466	3%
Calcium (mg)	118±139	3%	54±71	2%	75±115	2%
FEMALES						
Energy (kcal)	717±551	11%	388±285	6%	515±377	9%
Protein (g)	23±20	12%	15±13	6%	18±16	7%
Fat (g)	25±25	12%	13±13	6%	20±19	8%
Carbohydrate (g)	104±72	11%	54±41	7%	68±45	10%
Cholesterol (mg)	212±271	14%	44±35	5%	63±60	7%
Iron (mg)	6±7	12%	3±2	7%	4±3	8%
Sodium (mg)	836±840	10%	859±884	7%	1096±910	9%
Calcium (mg)	420±373	15%	101±80	6%	125±145	5%

Overall, females returned more available nutrients than did males, but there was a great deal of variability for both males and females. Standard deviations for both males and females were greater than the mean nutrient values. While the plate waste values calculated as a percent of the total nutrients selected do not reflect this variability, they were useful in identifying trends. The nutrients returned by males were uniformly distributed between breakfast, lunch, and dinner. Nutrient values of the plate waste were generally 2-3% of the total selected nutrients. Therefore, the males generally ate most of what they took. Conversely, the distribution of nutrients returned by females was not uniform at all meals. Females ate more of their food at lunch, although they still discarded 2-3 times more nutrients than males. On the average, females discarded the most nutrients at breakfast. The data cannot differentiate between whether the females selected or were given more food than they were willing or able to consume but they showed that females discarded larger amounts. In their evaluation of the dining facility (Table 28), females rated quantity of food served to them as a minor problem. Unfortunately, the question did not ask whether too much or too little food was the problem. The intake of smaller portions of food also was consistent with the desire of 62% of the females to lose weight (Table 8). However, again no definite conclusions can be drawn.

When subjects returned food, the reason why the food had not been eaten was recorded. Table 32 presents the reasons and the frequency with which the reasons were cited for plate waste. An unspecified category was created to include data from subjects who would not provide information or the less frequent instances when the data collector failed to obtain the information.

Table 32. Frequency of Reasons Cited for Plate Waste.

	MALE	FEMALE
Unspecified	94	119
No Time	44	78
Full	33	62
Don't Like	33	47
Gave Away	12	2
No Accompaniments	9	0
Not Hungry	4	17
Too Much	4	26
On A Diet	3	0
Feel Ill	4	9
Did Not Ask For Food	2	3
Served Too Often	0	2
Didn't Want	5	13
Not Thirsty	0	1
Saved	1	4
Threw Away	2	0
Too Cold	1	2
Bugs in Food	1	1
Raw/Not Cooked	2	0
Too Sweet	1	2
Too Mushy	3	5
Not Ripe	1	0
Too Dry	1	0
Looks Bad	0	4
Overcooked	0	2
Burnt	1	0
Too Spicy	0	2
Rotten	2	3
Dirt on Food	2	0
Too Soupy	0	1

The most frequent reason for not eating all the food that was served (excluding unspecified) was no time. The fact that no time was the most frequent reason given for plate waste supports the results of the section on Dining Facility Evaluation in which the length of time allotted for meals received a very poor evaluation (Table 28). As reported in the preceding

section on the Characteristics of Basic Trainee Meal Periods, the basic trainees spent an average of 4-6 min/meal to select their foods and an average of 10-12 min/meal to eat the foods. The selection times were longer than for other soldiers in a previous USARIEM study (75) but the consumption times were about 6-7 min shorter.

The next most common reasons for plate waste were: feeling full and dislike of a particular food. Overall, very few reasons attributed plate waste to poor quality of food. This concurs with the section of Dining Facility Evaluation (Table 28) in which the quality of food was not seen as a problem or an attraction. Females more frequently cited feeling full and having too much food as reasons for plate waste than did males, which indicates that the females were served more food than they wanted or needed.

Nutritional Adequacy

The military recommended dietary allowances (MRDA) were used to determine nutritional adequacy (47). Briefly, the MRDA are comparable with the National Academy of Sciences Recommended Dietary Allowances (RDA) (46) used nationally, although the MRDA for protein (male 100 mg, female 80 mg) is higher than the RDA (male 56 mg, females 44 mg). The higher MRDA for protein does not signify a higher physiological requirement for soldiers, but rather reflects the Army's desire to increase food palatability and acceptance.

The mean nutrient intakes of both male and female basic trainees taking part in this study met or exceeded the MRDA for the nutrients included in this analysis (Table 33). However, while the mean calcium intake for females (907 mg) may have been within the MRDA range of 800 - 1200 mg, the relatively young

Table 33. Mean Daily Intake of Selected Nutrients For 7 Days For U.S. Army Basic Trainees.

NUTRIENT	MALES (N=41)		FEMALES (N=40)		
	MRDA OR TARGET	INTAKE MEAN±SD	MRDA OR TARGET	INTAKE MEAN±SD	
Energy (kcal)	2800-3600	3199±736	2000-2800	2467±560	#
Protein (g)	100	125±33	80	96±22	#
(%PRO) ^a	none	16±4	none	16±5	
Fat (g)	none	121±41	none	94±34	#
(%FAT) ^b	≤35	34±10	≤35	34±11	
Carbohydrate (g)	none	410±97	none	318±74	#
(%CHO) ^c	50-55	52±12	50-55	52±14	
Vitamin A (mcg RE)	1000	2162±2192	800	1690±1338	#
Ascorbic Acid (mg)	60	200±85	60	165±117	#
Thiamin (mg)	1.6	2.82±0.9	1.2	2±0.6	#
Riboflavin (mg)	1.9	3.01±1	1.4	2.2±0.7	#
Niacin (mg)	21 ^d	33±9	16 ^d	27±7.4	#
Vitamin B ₁₂ (mcg)	3.0	5±2	3.0	3.65±1.5	#
Calcium (mg)	800-1200	1344±691	800-1200	907±428	#
Phosphorus (mg)	800-1200	2109±615	800-1200	1600±392	#
Iron (mg)	10-18	24±9	18	18.4±7	#
Sodium (mg)	---	5929±1808	---	4420±1158	#
Cholesterol (mg)	none	703±208	none	418±219	#

^a%PRO=Percent of total energy from protein.

^b%FAT=Percent of total energy from fat.

^c%CHO=Percent of total energy from carbohydrate.

^dMRDA values for niacin are calculated in milligrams of Niacin Equivalents.

#=Significant differences between males and females at p<0.05.

age of this sample does suggest that calcium requirements should be at the high end of the range. In this case, calcium intakes by the majority of the females would have been borderline.

The MRDA and RDA were developed as guidelines for populations not for individuals and the average dietary intakes for all subjects for all 7 days met the MRDA. However, the large standard deviations for some nutrients

indicate a need for further analysis to determine the extent of inadequate and excessive intakes. A substantial number of females (47%) had calcium intakes at or below the minimum of the recommended range of 800-1200 mg calcium, with only 15% of this female sample exceeding the upper limit (Table 34). Only 12% of the males had calcium intakes less than the minimum level of 800 mg calcium, whereas 60% had calcium intakes exceeding the upper limit of 1200 mg. Although greater than the requirements, high calcium intakes would not be detrimental to persons without kidney disease. On the other hand, the number (47%) of females with inadequate calcium intakes may pose a health problem because bone is probably still growing in 20 year old young adults.

As would be expected, dairy products provided the greatest contribution to the calcium intakes of both males and females (males 47%, females 49%). Menu items from the meat, grain, and vegetable groups accounted for a further 35% of the male and 33% of the female calcium intakes. Dairy ingredients used in the preparation of these items were included in their analysis and probably accounted for a large part of the calcium contribution of these products.

Table 34. Distribution of Calcium Intakes Among Male and Female Basic Trainees.

CALCIUM INTAKE LEVEL	MALE (N=41)		FEMALE (N=40)	
	N	(%)	N	(%)
Above 1200 mg	25	(60%)	6	(15%)
800-1200	11	(27%)	15	(38%)
700-799	2	(5%)	7	(17%)
600-699	1	(2%)	8	(20%)
500-599	2	(5%)	4	(10%)

Milk beverages were the minor dairy food group contributing the greatest percentage to calcium intakes. Milk beverages supplied 73% of the dairy groups' calcium contribution to both male and female intakes. Cheese products (cheddar and cottage cheese) provided 22% of the male's total dairy-supplied calcium and 18% of the females. Yogurt consumption accounted for 9% of the females' dairy calcium intakes and 5% of the males' dairy calcium. Yogurt was selected fifteen times by male subjects and fourteen times by females during the seven days. Yogurt was never selected at the lunch meal. Males more frequently selected yogurt at the dinner meal while females selected yogurt at the breakfast and dinner meals equally. As a source of calcium, this product did not appear to be very popular considering the number of times it was selected.

No significant difference was found for the type of milk consumed by males vs. females for nine meals. This analysis was limited to these nine meals since all subjects ate in the dining facility at these meals and had equal access to milk. A summary of the types of milk and the frequency of consumption for these meals is presented in Table 35. Low fat (2%) white milk was the most frequently selected milk by both males and females (42% and 50%, respectively). The least popular milk appeared to be skim. Whole milk was not served in the dining facility. During these nine meals 7% of the male and female subjects did not drink any type of milk. With adjustments for the lack of whole milk on the dining facility menu and the smaller size of this sample of subjects, these figures appear to be consistent with the past history of milk consumption for these soldiers (Table 24).

Table 35. Types of Milk Consumed During Nine Meals in the Dining Facility.

TYPE OF MILK	MALES (N=41)		FEMALES (N=40)	
	N	(%)	N	(%)
Did not drink	3	(7%)	3	(7%)
2% White	17	(42%)	20	(50%)
2% Chocolate	1	(2.5%)	5	(12%)
Skim	2	(5%)	1	(2%)
2% White/2% Chocolate ^a	14	(34%)	9	(23%)
2% White/Skim ^a	1	(2.5%)	2	(5%)
2% White/2% Choc/Skim ^a	3	(7%)	-	-

^aSubjects selected a combination of these types of milk during the 9 meals. Information is not available as to whether the different types of milk were mixed into one drink or whether the type of milk was alternated at different meals.

Milk was consumed most frequently at the breakfast meal. Sixty-three percent of both males and females consumed milk during the four breakfast meals compared with 25% at the one lunch and four dinner meals. The increased frequency of milk consumption at breakfast was attributed to the consumption of dry cereal at that meal.

The mean amount of milk consumed by the basic trainees was determined for these nine meals. For this analysis milk consumption was divided into seven different categories of amounts consumed (Table 36). A mean value for each subject was calculated and included in the appropriate consumption category. No significant differences were found between males and females in the amount of milk consumed for these nine meals, except that fewer females drank milk at the upper levels.

Problems with lactose intolerance tend to reduce milk intake. These young basic trainees did not appear to have problems with milk consumption. An

equal percentage of males and females did not drink any milk and the absolute numbers were small. In terms of the racial composition of the number who did not drink any milk or who drank very little milk, one black female and 3 black males did not drink any milk during the nine meals which were studied. The difference in quantity of milk consumed by blacks and whites was not significant for any of the different levels of milk consumption.

The mean intake of calcium was lower for females than for males (Table 33), but the previous discussion shows that males and females were consuming similar food sources of calcium, types of milk, and amounts of milk. The difference in the intake of calcium is probably related to the overall quantity of food ingested.

Individual mean intakes for nutrients other than calcium also were compared with the MRDA. As with the mean nutrient intakes for the entire sample, individual mean intakes for seven days met or exceeded these standards with only a few exceptions (Table 37). Nutrients for which the mean intake

Table 36. Mean Milk Consumption for Nine Dining Facility Meals.

MEAN AMOUNT OF MILK CONSUMED PER MEAL	MALES (N=41)		FEMALES (N=40)	
	N	(%)	N	(%)
No Milk	3	(7%)	3	(7%)
<1 oz	5	(12%)	7	(18%)
1-6 oz	22	(54%)	24	(60%)
6-10 oz	4	(10%)	3	(7%)
10-14 oz	2	(5%)	2	(5%)
14-18 oz	2	(5%)	0	(0%)
>18 oz	3	(7%)	1	(3%)

Table 37. Distribution of Nutrient Intakes for Males and Females Where Inadequate Nutrient Intakes Were Noted.

NUTRIENT	INTAKE LEVEL	MALE (N=41)		FEMALE (N=40)	
		N	(%)	N	(%)
Vitamin B ₁₂	at or above MRDA	39	(95%)	28	(70%)
	90-99% MRDA	2	(5%)	5	(12%)
	80-89% MRDA	--		4	(10%)
	70-79% MRDA	--		3	(8%)
Vitamin A	at or above MRDA	35	(85%)	38	(95%)
	90-99% MRDA	4	(10%)	--	
	80-89% MRDA	1	(2.5%)	--	
	70-79% MRDA	1	(2.5%)	1	(2.5%)
	60-69% MRDA	--		1	(2.5%)
Iron	at or above MRDA	41	(100%)	20	(50%)
	90-99% MRDA	--		5	(12.5%)
	80-89% MRDA	--		10	(25%)
	70-79% MRDA	--		5	(12.5%)
Niacin	at or above MRDA	41	(100%)	39	(98%)
	90-99% MRDA	--		1	(2%)
Vitamin C	at or above MRDA	41	(100%)	39	(98%)
	60-69% MRDA	--		1	(2%)

level was below the MRDA for males were Vitamin B₁₂, Vitamin A, and riboflavin. For females these nutrients were iron, Vitamin C, Vitamin B₁₂, Vitamin A, and niacin.

While inadequacies were noted in the nutrient intakes for a small subsample, the overall adequacy of both the menu and food intakes were excellent. Significantly inadequate nutrient intakes would have been surprising, given the nutrient density and variety provided by the menu, as well as the fact that subjects were compelled to attend three meals per day. The only major inadequacies noted were for the iron (Table 37) and calcium

intakes (Table 34) of females which reflects the patterns of the civilian population. The extent of these inadequacies, however, was not as great as expected. The primary reason for these inadequate intakes, as well as the others mentioned, was not due to nonavailability on the menu, but the failure of specific individuals to select or eat foods high in these nutrients for reasons of preference.

Vitamin A intakes were twice the MRDA which reflected the availability of this nutrient in the study menu. However, excesses do not produce toxic effects until daily intakes exceed 7.5 times the MRDA in adults (46). Also, analysis of Vitamin A intakes indicated that major sources for this vitamin were foods high in carotenes (a provitamin). High carotene intakes are not toxic but may cause minor side-effects.

Since significant differences exist between both the energy requirements and caloric intakes of males and females, nutrient intakes were expressed per 1000 kcal to determine gender differences. The mean nutrient density index (NDI) is presented in Table 38.

Significant differences ($p < 0.05$) were found between the male and female NDI for thiamin, niacin, potassium, and cholesterol. Female NDI for thiamin (male 0.89 mg, female 0.84 mg) and cholesterol (male 225 mg, female 170 mg) were significantly lower than the male NDI for these nutrients. The NDI for niacin (male 10.3 mg, female 11.1 mg) and potassium (male 1289 mg, female 1412 mg) were significantly higher for females than males. For the most part, these differences are due to differences in the male and female consumption of eggs, dairy products, fruits, grain products, and peanut butter. Food

Table 38. Mean Nutrient Density Index (NDI)^a for Selected Nutrients for Dietary Intakes of U.S. Army Basic Trainees.

NUTRIENT	NDI (Mean ± SD)			
	MILITARY MENU GUIDELINE ^b	STUDY MENU	MALE (N=41)	FEMALE (N=40)
<-----per 1000 kcal----->				
Protein (g)	33	36	40±6	39±7
Vitamin A (mcg RE)	333	857	679±673	713±610
Ascorbic Acid (mg)	25	43	65±29	69±40
Thiamin (mg)	0.5	0.7	0.89±0.23	0.84±0.22 #
Riboflavin (mg)	0.6	1.0	0.93±0.21	0.92±0.23
Niacin (mg)	6.7	9.3	10.3±1.9	11.1±2.4 #
Calcium (mg)	333	509	409±152	369±155
Phosphorus (mg)	333	637	662±118	659±127
Iron (mg)	6.0	6.7	7.5±2.5	7.6±3.0
Sodium (mg)	1700	1731	1856±396	1819±403
Potassium (mg)	None	1284	1289±236	1412±277 #
Vitamin B ₁₂ (mcg)	None	1.7	1.5±0.6	1.5±0.6
Fat (g)	None	42	37±7	37±7
Carbohydrate (g)	None	125	129±16	130±17
Cholesterol (mg)	None	174	225±68	170±83 #

^aNutrients/1000 kcal

^bBased on AR 40-25, Military Menu Guidelines.

#=Significant differences between males and females at p<0.05.

SD=Standard Deviation

consumption differences are discussed in following sections of this report.

The mean NDI also was used to compare nutrient intakes for males and females at different levels of energy (kcal) intake (Tables 39 and 40). This comparison was done to determine if nutrient intakes were inadequate at the lower levels of energy intake. The mean NDI's for males and females met or exceeded the military recommendations at almost all levels of energy intake.

Table 39. Mean Nutrient Density Index (NDI)^a of Selected Nutrients For MALE Basic Trainees Consuming Different Energy (kcal) Levels.

NUTRIENT	NDI (Mean ± SD)						
	ENERGY INTAKE LEVEL (kcal)						
	MILITARY MENU GUIDELINE ^b	STUDY MEAN MALE	2000-2499 (N=7)	2500-2999 (N=6)	3000-3499 (N=14)	3500-3999 (N=12)	4000-4999 (N=2)
<-----per 1000 kcal----->							
Protein (g)	33	40	44	40	38	39	38
Fat (g)	none	37	37	36	37	39	39
Carbohydrate (g)	none	129	124	133	133	125	128
Cholesterol (mg)	none	225	272	232	219	209	189
Vitamin A (mcg RE)	333	679	646	882	712	558	696
Thiamin (mg)	0.5	0.89	0.91	0.85	0.91	0.88	0.83
Riboflavin (mg)	0.6	0.93	0.87	0.90	0.89	1.02	0.94
Niacin (mg)	6.7	10.3	10.6	10.3	10.5	10.0	10.3
Vitamin B ₁₂ (mcg)	none	1.5	1.7	1.7	1.3	1.6	1.6
Ascorbic Acid (mg)	25	65	80	75	66	52	61
Sodium (mg)	1700	1856	1900	1760	1882	1821	2061
Potassium (mg)	none	1289	1369	1373	1206	1300	1219
Iron (mg)	6.0	7.5	7.2	6.7	8.0	7.6	7.4
Calcium (mg)	333	409	354	402	368	486	454
Phosphorus (mg)	333	662	701	670	625	684	641

^aNutrients/1000 kcal

^bBased on AR 40-25, Military Menu Guidelines.

SD=Standard Deviation

Table 40. Mean Nutrient Density Index (NDI)^a of Selected Nutrients For FEMALE Basic Trainees Consuming Energy (kcal) Levels.

NUTRIENT	NDI (MEAN ± SD)						
	ENERGY INTAKE LEVEL (kcal)						
	MILITARY MENU GUIDELINE ^b	STUDY MEAN FEMALE	1500- 1999 (N=4)	2000- 2499 (N=18)	2500- 2999 (N=15)	3000- 3499 (N=2)	3500- 3999 (N=1)
<-----per 1000 kcal----->							
Protein (g)	33	39	44	40	38	38	32
Fat (g)	none	37	32	36	39	42	47
Carbohydrate (g)	none	130	137	132	127	120	116
Cholesterol (mg)	none	170	129	185	162	179	175
Vitamin A (mcg RE)	333	713	948	859	538	380	507
Thiamin (mg)	0.5	0.84	0.97	0.82	0.84	0.81	0.68
Riboflavin (mg)	0.6	0.92	1.0	0.92	0.89	1.0	0.74
Niacin (mg)	6.7	11.1	13.5	10.8	11.2	10.2	8.9
Vitamin B ₁₂ (mcg)	none	1.5	1.4	1.6	1.4	1.7	1.2
Ascorbic Acid (mg)	25	69	107	68	64	44	40
Sodium (mg)	1700	1819	1841	1897	1770	1579	1744
Potassium (mg)	none	1412	1692	1426	1358	1303	1033
Iron (mg)	6.0	7.6	9.9	7.6	7.2	7.1	5.8
Calcium (mg)	333	369	415	372	344	480	289
Phosphorus (mg)	333	659	726	680	623	679	530

^aNutrients/1000 kcal

^bBased on AR 40-25, Military Menu Guidelines.

SD=Standard Deviation

Dietary Energy: Intakes and Food Sources

The mean energy intakes for the entire study period were 3199±736 kcal (x±SD) for the male basic trainees and 2467±560 kcal for the females (Table 33). The highest mean daily energy intake occurred on Day 1 for males who were consuming 3380±991 kcal and on day 3 for females who consumed 2686±640

kcal. On Day 5 the males and females consumed the least energy of any study day (2995 ± 766 kcal and 2255 ± 427 kcal, respectively).

The mean distribution of energy intake at breakfast, lunch, and dinner for each of the seven days was constant for both males and females, with approximately one-third of the day's calories consumed at each meal. The mean energy intakes for males at breakfast, lunch, and dinner were 1051 ± 337 , 1051 ± 327 , and 1064 ± 332 kcal, respectively. For females the mean meal intakes were 808 ± 282 kcal for breakfast, 847 ± 282 kcal for lunch, and 804 ± 242 kcal for dinner. Since the mean intakes for each day were calculated using individual mean intakes to replace missing data and the mean intakes for meals were calculated without replacing the missing values, slight differences occurred when meals were totaled to obtain a mean value for a day. Individual mean energy intakes during the seven days ranged from a minimum of 2081 kcal to a maximum of 4250 kcal for men and 1658 kcal to 3631 kcal for females.

Energy intakes were compared to the desire of basic trainees to alter their weight (Table 41). Most males and females at the upper or lower energy intake intervals appeared to be there deliberately due to a desire to gain or lose weight. However, indepth analysis of these data is impossible due to the complexity of the situation. For instance, energy expenditure data is missing, the basic trainees were just starting an intense exercise program which could affect their appetite either way, and adjustment to a totally new way of life affect people differently. Pre- and post-weights were obtained on these subjects and suggested a slight tendency for males and females to gain approximately 1-2 pounds during this time period. However, physiologically these figures are insignificant and cannot be attributed to

excess caloric intake. The weight gain could have been fat, water, or increased muscle mass (due to the exercise program).

The data presented in Table 41 may reinforce the conception of the company level cadre that a weight problem does exist in basic training and suggest that further study is necessary. Two major perceptions were reached from conversations with the company level cadre. First, an increasing number of overweight soldiers are being allowed in the Army. Second, basic trainees are gaining unwanted weight during basic training. However, the cadre were unable to provide any official records to support these perceptions.

Table 41. Comparison of Mean Energy Intake Levels for Seven Days with the Desire to Gain, Lose or Maintain Weight^a.

GENDER	MEAN ENERGY INTAKE LEVEL (kcal)	TOTAL N	DESIRE TO		
			GAIN WEIGHT (N)	LOSE WEIGHT (N)	MAINTAIN SAME WEIGHT (N)
Male	2000-2499	7	1	5	1
	2500-2999	6	0	5	1
	3000-3499	14	8	3	3
	3500-3999	12	8	0	4
	4000-4250	2	2	0	0
Female	1600-1999	4	0	4	0
	2000-2499	18	1	13	4
	2500-2999	15	0	10	5
	3000-3499	2	0	2	0
	3500-3631	1	1	0	0

^aRefer to Demographic Section for a discussion of the questionnaire data regarding this statement.

The impact on energy intake of foods not provided by the dining facility was minimal since fewer than 1% of the meals were eaten elsewhere (Table 30). Snacks were reported consumed by five males and fourteen females during the entire study. Mean intakes for snacks averaged between 298 kcal and 274 kcal, however variances equal to or surpassing the mean intakes were found. The calories provided by MRE meals (Appendix P) and other differences between field meals and dining facility meals (Appendix O) are discussed in more detail.

Overall, the mean percent contributions of protein (%PRO), carbohydrate (%CHO), and fat (%FAT) to the mean daily energy intake of males were $16 \pm 4\%$, $52 \pm 12\%$, and $34 \pm 10\%$, respectively (Table 42 and Figures 3-5). Mean contributions of these nutrients to the mean energy intake of females were $16 \pm 5\%$ PRO, $52 \pm 14\%$ CHO, and $34 \pm 11\%$ FAT. These data show that the dietary intake of both males and females met the MRDA for the distribution of calories among carbohydrate, protein, and fat. This is the first USARIEM dining facility study in which subjects have met the Army's goal for total dietary fat intakes of less than 35%FAT ($<35\%$ FAT). However, this level of fat intake may have been a result of the unique Fort Jackson menu, not an indication that the nutrition initiatives were working. Lower fat intakes may have been the result of the absence of a short order line. If the popular french fries, potato chips, and high fat sandwiches had been available on a daily basis, fat intakes may have been higher. As reported in the Nutrition Knowledge Section, the nutrition knowledge of the trainees was fair to poor. Their attitudes when given a hypothetical chance to select higher vs. lower calorie foods showed a decided tendency to select foods based on their preference for the higher fat, higher calorie foods.

FIGURE 3 AVERAGE PERCENT CONTRIBUTION OF PROTEIN TO TOTAL ENERGY (KCAL) CONSUMPTION

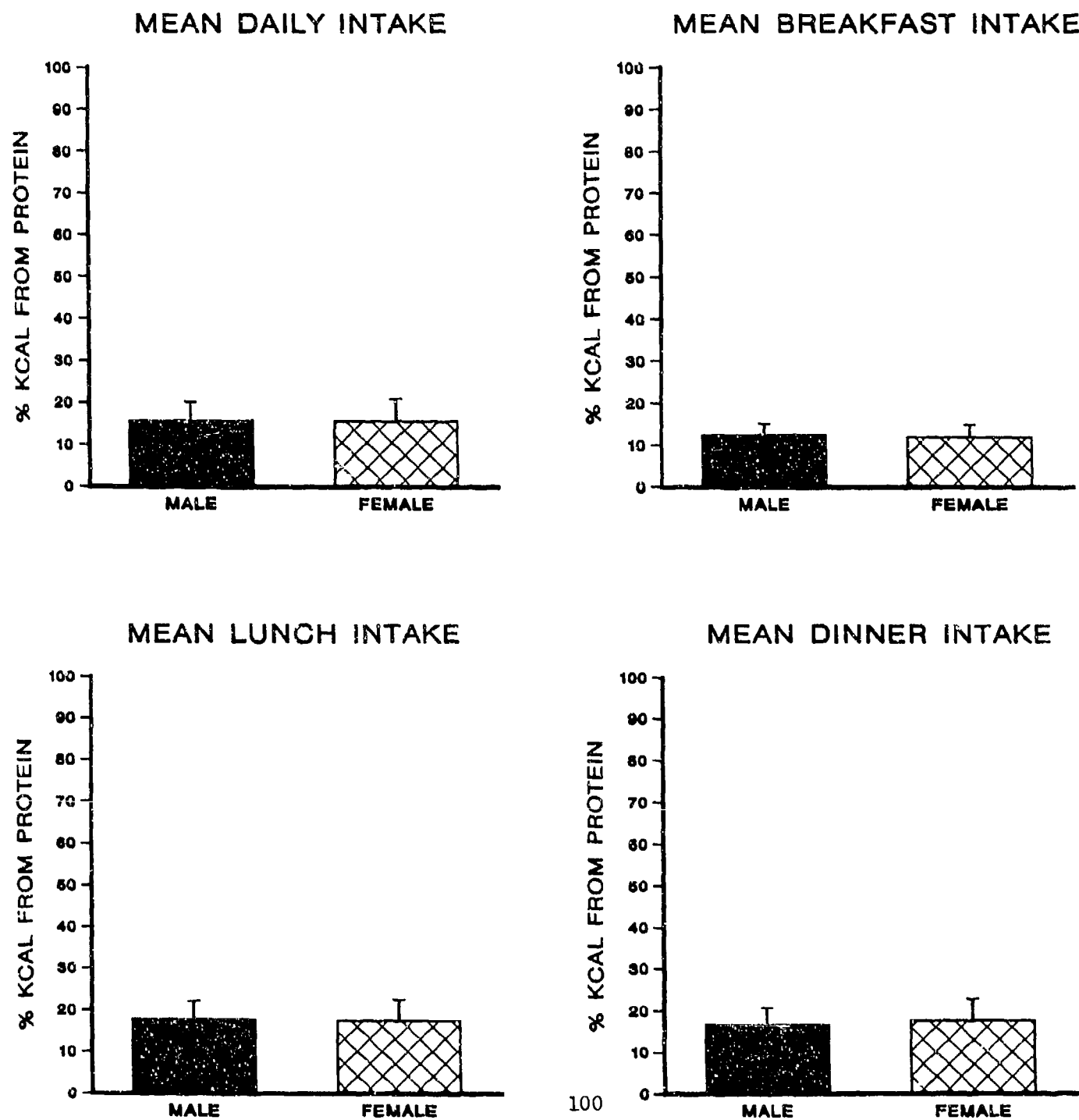


FIGURE 4 AVERAGE PERCENT OF CARBOHYDRATE TO TOTAL ENERGY (KCAL) CONSUMPTION

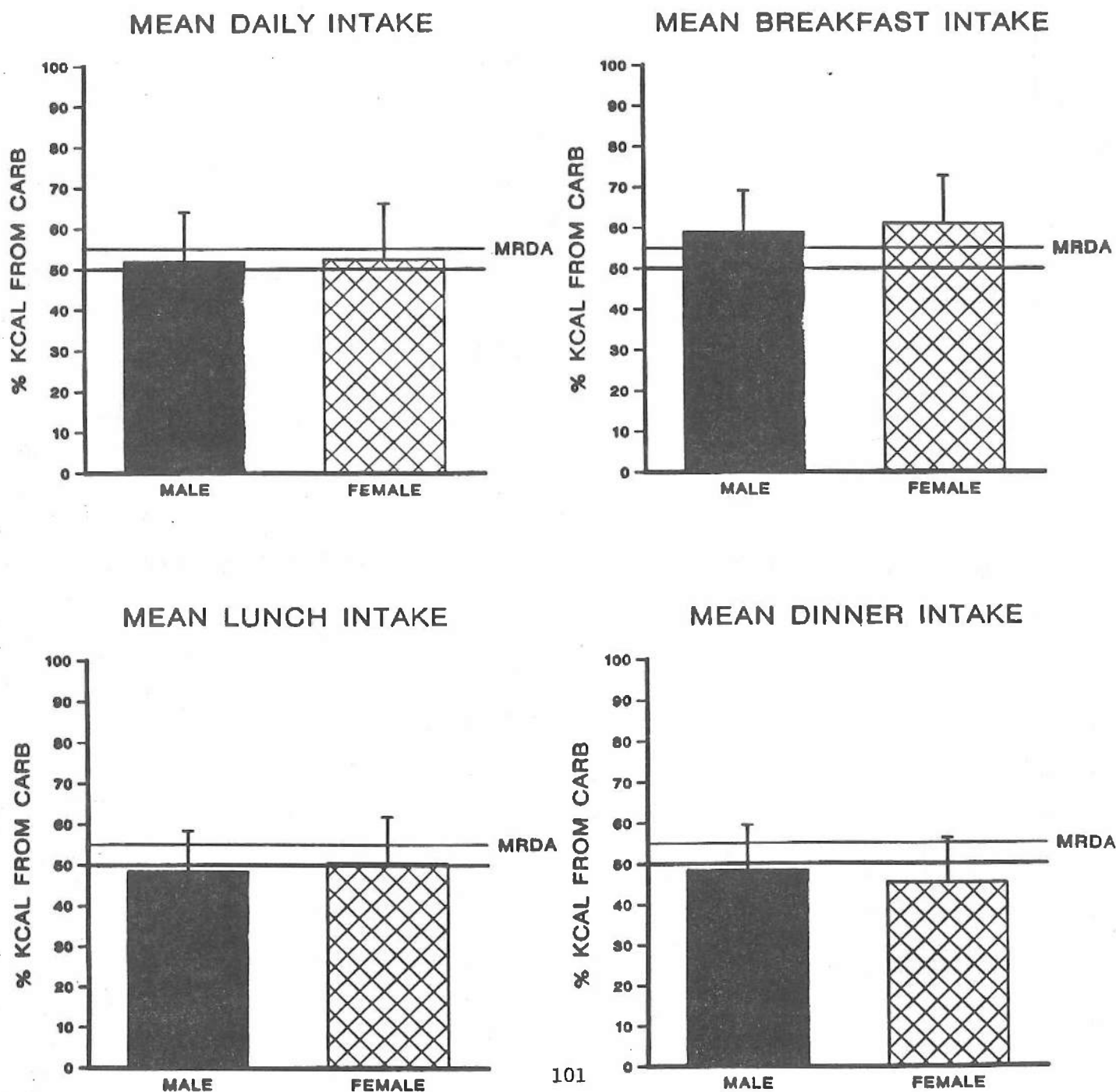


FIGURE 5 AVERAGE PERCENT OF FAT
TO TOTAL ENERGY (KCAL) CONSUMPTION

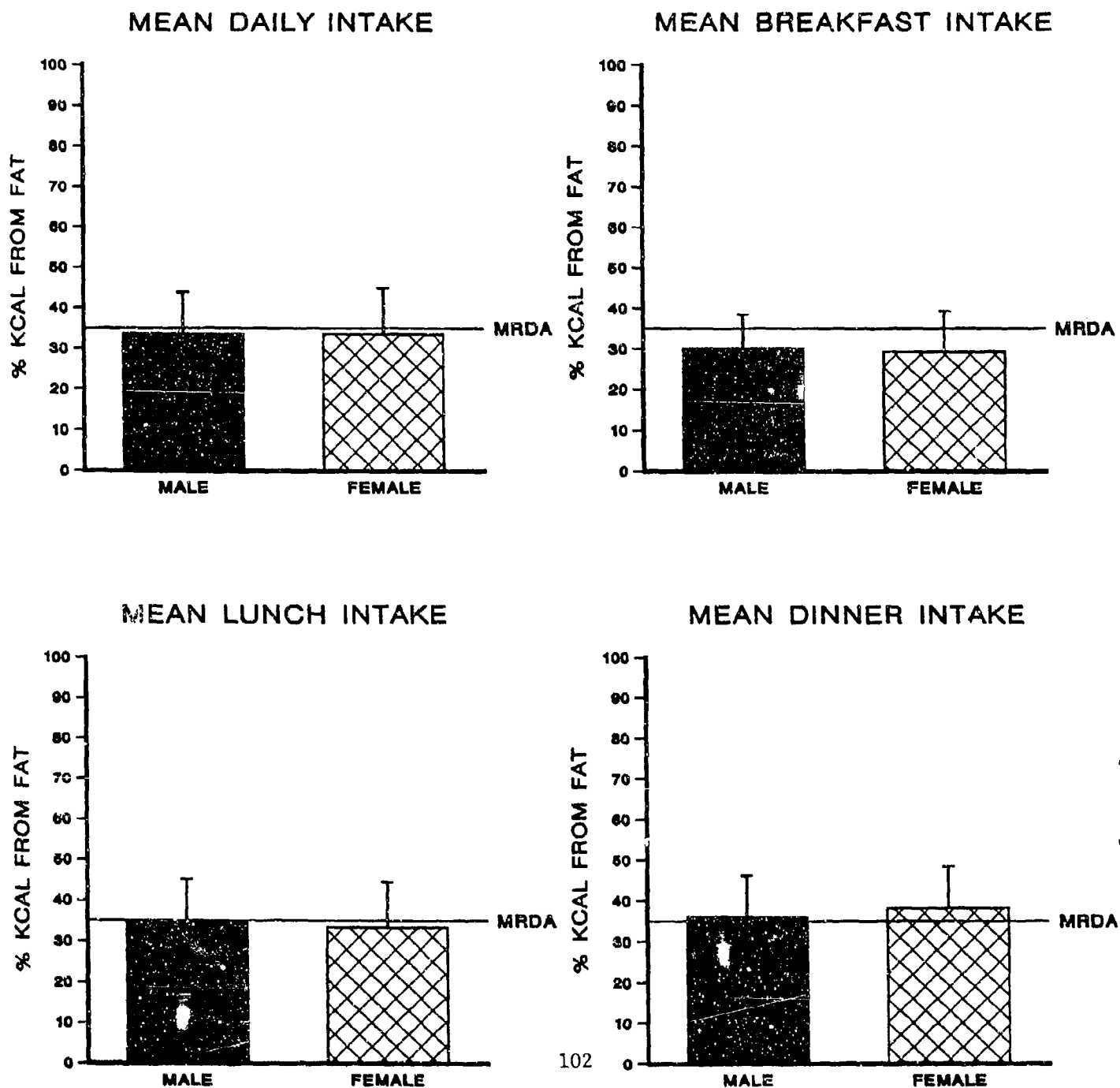


Table 42. Mean Percent Contributions to Mean ENERGY INTAKE (kcal) of Protein, Carbohydrate, and Fat for Seven Days.

MEAL	%PRO±SD ^a		%CHO±SD ^b		%FAT±SD ^c	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
Breakfast	12±3	12±3	59±10	61±12	30±8	29±10
Lunch	18±4	18±5	48±10	50±11	35±10	33±11
Dinner	17±4	18±5	48±11	45±10	36±10	39±10
All Meals	16±4	16±5	52±12	52±14	34±10	34±11

^a%PRO=Percent of total energy from protein.

^b%CHO=Percent of total energy from carbohydrate.

^c%FAT=Percent of total energy from fat.

Although the mean energy intakes of males and females were constant and equally distributed for breakfast, lunch, and dinner, the contributions to the mean energy intakes by protein, carbohydrate, and fat varied at each meal (Table 42 and Figures 3-5). Overall, carbohydrates contributed more to the male and female energy intakes at breakfast than at lunch and dinner. Consumption of foods higher in protein and fat increased the contribution of these nutrients to the mean energy intake for lunch and dinner.

Contributions of Major Food Groups to Energy Intake

Table 43 presents the contributions of the major food groups to the energy intakes by meal and by study day. Foods from the meat/entree and grain groups contributed the most to the energy intakes of both males and females at breakfast, lunch, and dinner (Table 43 and Figure 6). For males,

Figure 6
PERCENT CONTRIBUTIONS OF MAJOR FOOD GROUPS
TO TOTAL ENERGY INTAKE (KCAL)
FOR SEVEN DAYS

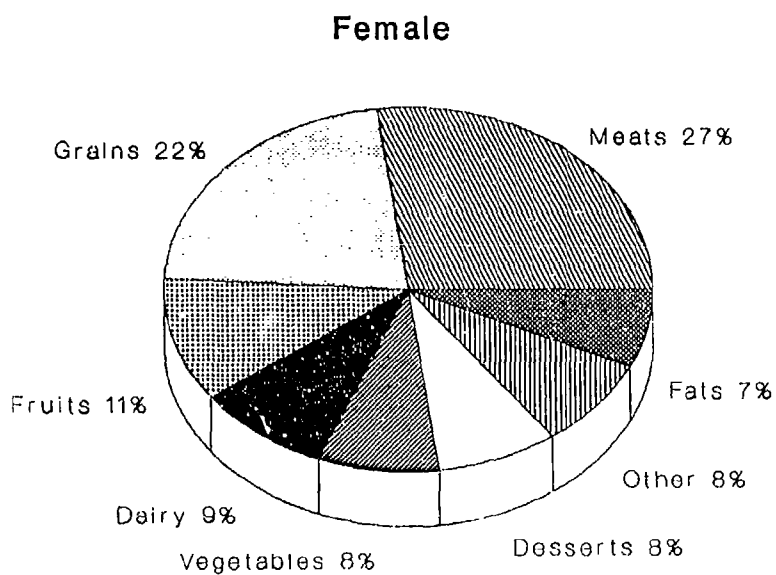
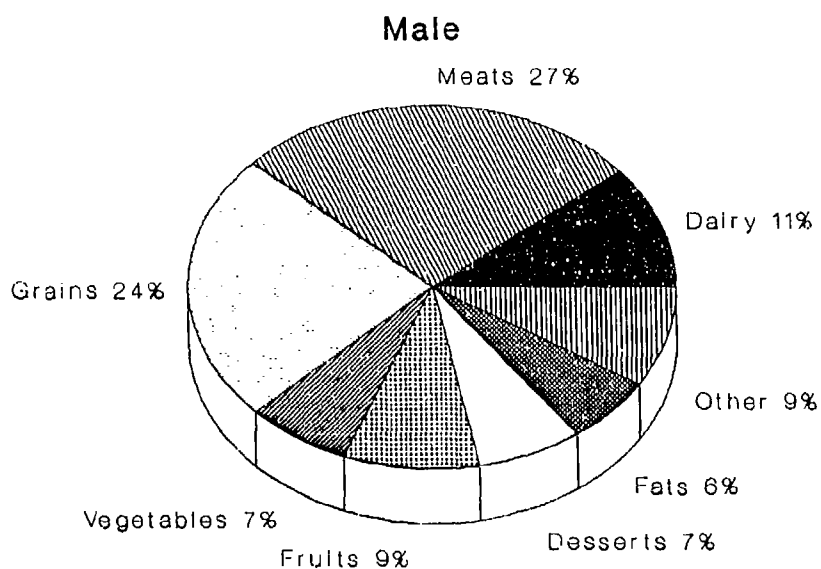


Table 43. Percent Contributions of Major Food Groups to TOTAL ENERGY Intake (kcal) for Seven Days.

MAJOR FOOD GROUPS	BREAKFAST		LUNCH		DINNER		TOTAL	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
Dairy	10%	12%	8%	4%	14%	11%	11%	9%
Meat/Entrees	24%	18%	30	32%	27%	31%	27%	27%
Grains	28%	24%	20%	21%	24%	21%	24%	22%
Peanut Butter	3%	7%	- ^a	-	-	-	1%	2%
Vegetables	2%	3%	9%	10%	10%	11%	7%	8%
Fruits	16%	20%	5%	8%	5%	6%	9%	11%
Desserts/Sweets	14%	12%	7%	10%	1%	2%	7%	8%
Table Fats	3%	4%	4%	8%	9%	11%	6%	7%
Condiments	-	-	1%	<1%	1%	1%	<1%	1%
MRE	-	-	7%	-	-	-	2%	0%
Beverages	-	-	7%	7%	8%	7%	5%	4%
Crackers	-	-	2%	<1%	2%	1%	1%	1%

^aUnavailable at this meal.

the meat/entrees accounted for 24% of the breakfast energy intake, 30% of the lunch intake, and 27% of the dinner intake. When all meals for all 7 days were pooled, meat/entrees accounted for the largest contribution of 27% to the total daily energy intake for males.

Females obtained almost a third of their lunch and dinner calories from meat/entrees but only 18% of the energy intake came from breakfast meat/entrees (Table 43). The selection rates for meat items (excluding eggs) at breakfast were similar for males and females (Appendix Q), however, the plate waste (Table 31) data show that the females may have taken the breakfast meats but they tended to throw away more of these foods than males. Another reason that meat/entrees contributed a lower percentage to energy intakes at breakfast was that females consumed more fruits and peanut butter

than males thus increasing the female caloric contribution from carbohydrates and fat. Other possible reasons for the lower percentage from the meat/entree group were that portion sizes of breakfast meats were generally smaller than that of meat entrees at lunch or dinner and that maple syrup, jams, jellies, and sugar were mainly consumed at the breakfast meals to increase the caloric contribution from the dessert/sweet group.

The relative contribution by grains to energy intake also was slightly higher at breakfast than at lunch or dinner (Table 43). Grains accounted for 28% of the breakfast energy intake for males and 24% for females. Items unique to the breakfast meal accounted for the increased contributions of grains at breakfast. Dry cereals, cooked cereals, waffles, pancakes, and french toast were unique to the breakfast meal.

Fruit contributions to energy intake were higher at breakfast, probably due to the greater availability of fruit juices, canned fruit, and fresh fruit at this meal (Table 43). Overall, citrus fruits and/or juices accounted for one third of the males 9% fruit contribution to energy intake. Only one fifth of the female fruit calories came from citrus fruits/juices. The female intake for ascorbic acid (Table 33) was lower than for males, indicating a greater preference for citrus fruits/juices by males.

The table fat and vegetable groups' contributions to energy intake were higher at lunch and dinner (Table 43). The addition of gravies and salad dressings to the lunch and dinner meals increased the table fat group contribution. Since melted margarine was not served with the pancakes, waffles, and french toast at this dining facility, overall consumption of

margarine/butter may have been lower than at other dining facilities where melted margarine is almost automatically served with the maple syrup.

While the contribution of dairy products to total energy intake was generally higher at breakfast than at the other meals, the percent contribution was similar for breakfast (males 10%, females 12%) and dinner (males 14%, females 11%). The lower contribution of dairy products to lunch energy intakes was primarily the result of field feeding where dairy products were not served. Overall, milk beverages, cheeses, and yogurt accounted for 68%, 25%, and 6%, respectively, of the total dairy contribution to energy intakes by males. For females, milk, cheese, and yogurt contributions were 67%, 21%, and 12%, respectively.

The Army's target for refined sugar intake of 10% of energy intake was slightly exceeded (47). On the average, 12% of the total energy intake for both males and females was provided by foods high in refined sugar. While the difference between the target and actual intakes was small, it is of interest considering the limited menu offerings of sweets i.e., limited dessert offerings, no sugar-coated cereals, limited intake of carbonated beverages, etc.

Dietary Protein: Intakes and Food Sources

Foods from the meat/entree, dairy, and grain groups were the main sources for dietary protein, accounting for 86% and 87% of the daily protein intake of males and females during an average day (Table 44 and Figure 7). Foods from the meat/entree group contributed the greatest percentage of protein at each meal with contributions being the lowest at the breakfast meal (male

Figure 7
PERCENT CONTRIBUTIONS OF MAJOR FOOD GROUPS
TO TOTAL PROTEIN INTAKE FOR SEVEN DAYS

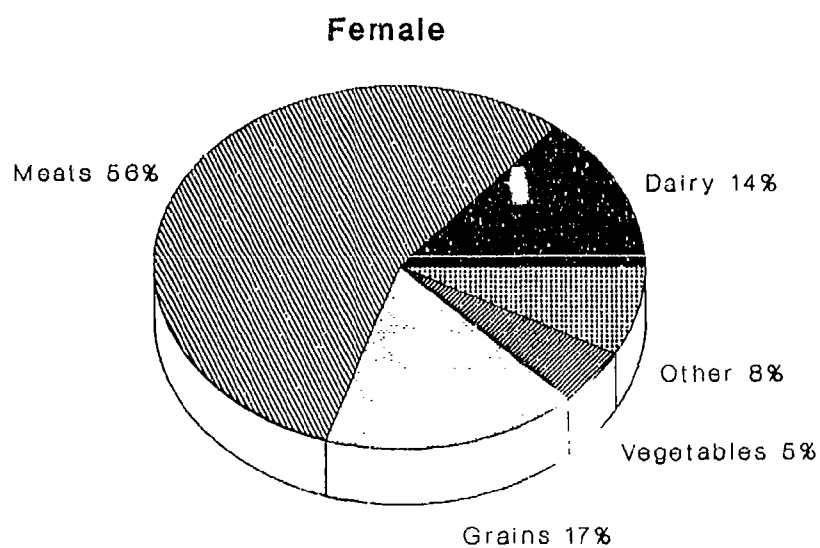
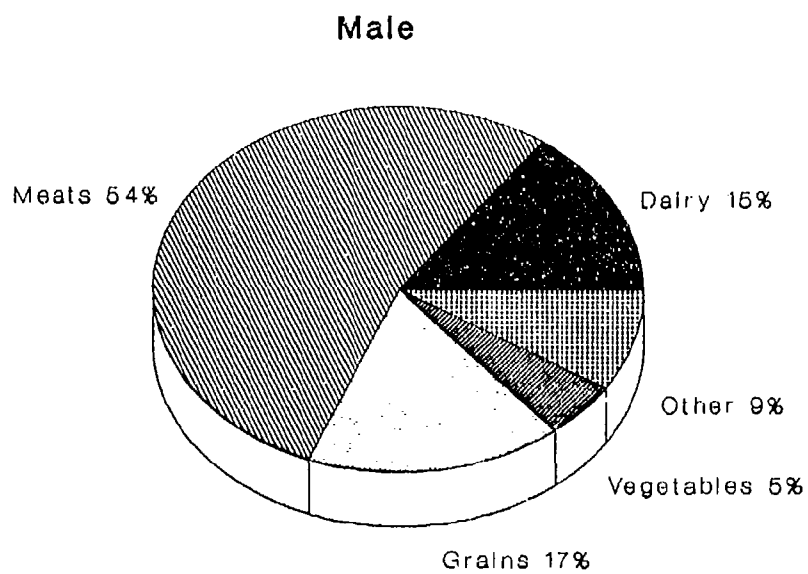


Table 44. Percent Contributions of Major Food Groups to TOTAL PROTEIN Intake for Seven Days.

MAJOR FOOD GROUP	BREAKFAST		LUNCH		DINNER		TOTAL	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
Dairy	19%	23%	10%	6%	18%	15%	15%	14%
Meats/Entrees	44%	35%	61%	67%	55%	60%	54%	56%
Grains	26%	24%	12%	14%	17%	15%	17%	17%
Peanut Butter	4%	9%	-	-	-	-	1%	2%
Vegetables	<1%	1%	5%	7%	6%	7%	5%	5%
Fruits	6%	7%	1%	2%	1%	1%	2%	3%
Desserts/Sweets	<1%	<1%	2%	3%	<1%	<1%	1%	1%
Fats	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
Condiments	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
MRE	-	-	7%	-	-	-	2%	-
Beverages	-	-	-	-	-	-	-	-
Crackers	-	-	<1%	<1%	<1%	<1%	<1%	<1%

44%, female 35%). Daily protein contributions from the meat/entree group accounted for 54% of the male and 56% of the female protein intakes. Roughly, that would equate to a mean protein intake from the meat/entrees food group of 68 g for males and 54 g for females or about half of the mean daily intake of 125 g for males and 96 g for females. Mean daily protein intake for males and females exceeded the MRDA by 20-25% (MRDA males 100 g, females 80 g). This level of protein intake from meats also provided high levels of saturated fat.

Another animal source of protein was the dairy group which accounted for 15% and 14% of the daily male and female protein intakes (Table 44). The majority of protein from vegetable sources was provided by the grain group, but eggs and dairy products used in the preparation of grain dishes such as pancakes, french toast, waffles, and bread products were included in the overall grain contribution to protein.

Protein intake from legumes was limited. Peanut butter was the only food item in the legume group and accounted for 9% of the female breakfast protein intake but only 2% of the total female protein intake (Table 44). Kidney beans were used in the preparation of Chili Con Carne and Three Bean Salad, however, Chili was only served once and Three Bean Salad appeared on the salad bar on two days. Protein contributions by these legumes were included in the contributions of the meat/entrees and vegetable groups.

The contributions of specific meat subgroups (minor meat group) to protein intakes from the meat/entree group are presented in Table 45. Mixed dishes such as Chili Con Carne, Lasagna, Beef Stew, etc. were pooled and included as

Table 45. Percent Contributions of Minor Meat Groups to TOTAL PROTEIN Intake from Meats/Entrees.

MINOR MEAT GROUP	MALE % TOTAL	FEMALE % TOTAL
Eggs	13	7
Bacon	6	7
Sausage Products	6	6
Beef	13	15
Soy Extended Beef	3	3
Veal	8	6
Pork	14	11
Chicken	6	8
Turkey	6	7
Fish	4	7
Cured Meats	5	5
Combination Meats	17	18

combination dishes. The relatively low protein to fat ratio of meats such as bacon and sausage is illustrated by the low percent contribution to total

protein intake. Although these items were served daily and had high selection rates, their contributions to total protein intake were lower than those of meats served less frequently, but with a similar selection rate. Higher consumption of visible eggs by males and higher chicken, turkey, and fish consumption by females also was indicated.

Dietary Carbohydrate: Intakes and Food Sources

Mean carbohydrate (CHO) calories as a percent of total energy intake (%CHO) accounted for 52% of both the male and female energy intake (Table 42). The Army target for carbohydrate intake is between 50 to 55%CHO (47). Menu items from the grain, fruit, dessert/sweet, and vegetable groups contributed 72% and 76% of the male and female carbohydrate intakes, respectively (Table 46 and Figure 8).

Grains provided the greatest amount of carbohydrate to the diet. Almost half of the carbohydrate supplied by the grain group was from commercial breads. Other major contributors were cereals, pancakes, waffles, and french toast. Combined, cooked and ready-to-eat cereal consumption was similar for males and females. However, males consumed more cooked cereal than females, with females preferring ready-to-eat cereals. Females also tended to prefer wheat bread more than did males. Sugar-coated ready-to-eat cereals were not served to basic trainees. Pancakes, waffles, and french toast as a subgroup provided 16% and 17%, respectively, of the male and female carbohydrate intakes. Rice and pastas contributed 7% and 5% of the male and female carbohydrate intake.

Figure 8
PERCENT CONTRIBUTIONS OF MAJOR FOOD GROUPS
TO TOTAL CARBOHYDRATE INTAKE FOR SEVEN DAYS

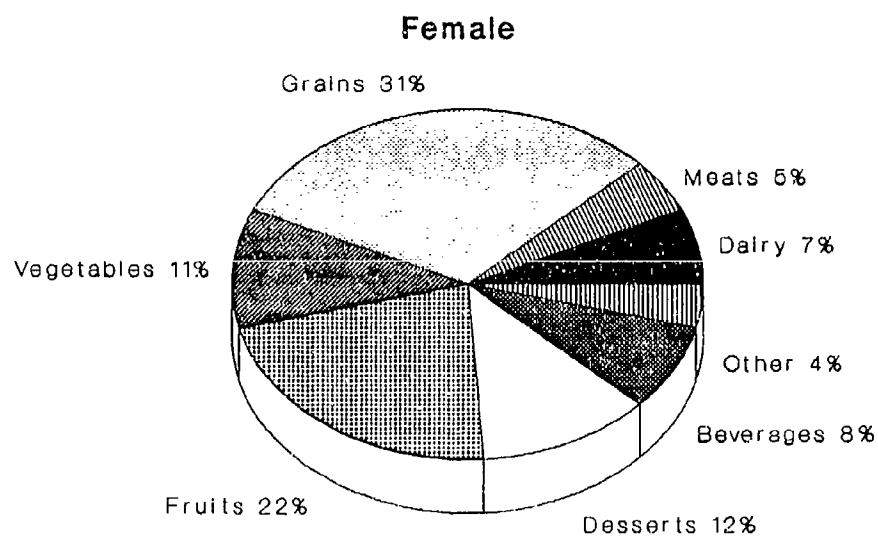
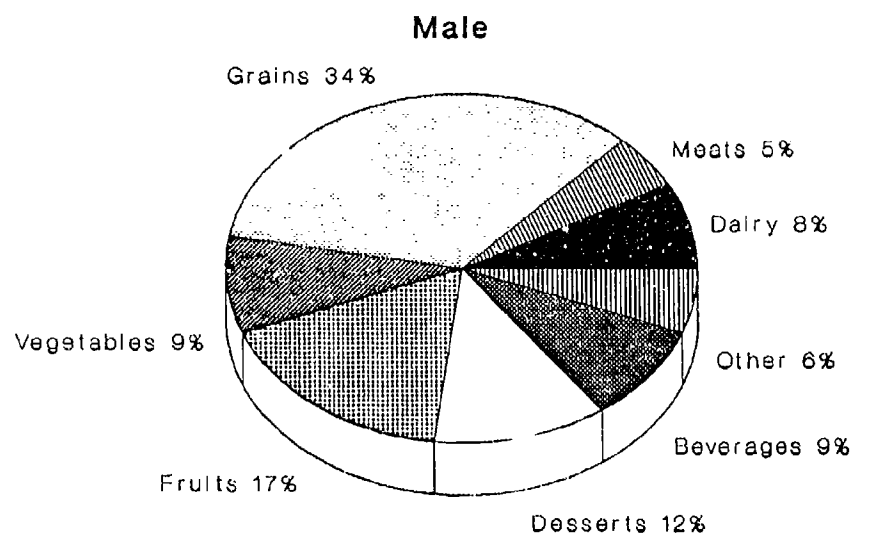


Table 46. Percent Contributions of Major Food Groups to TOTAL CARBOHYDRATE Intake for Seven Days.

MAJOR FOOD GROUP	BREAKFAST		LUNCH		DINNER		TOTAL	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
Dairy	8%	10%	5%	3%	12%	9%	8%	7%
Meats/Entrees	1%	<1%	8%	7%	6%	8%	5%	5%
Grains	36%	32%	31%	31%	35%	32%	34%	31%
Peanut Butter	<1%	1%	-	-	-	-	<1%	<1%
Vegetables	2%	3%	13%	15%	14%	17%	9%	11%
Fruits	27%	33%	10%	17%	10%	14%	17%	22%
Desserts/Sweets	24%	20%	9%	11%	2%	3%	12%	12%
Table Fats	<1%	<1%	2%	2%	2%	2%	1%	1%
Condiments	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
MRE	-	-	6%	-	-	-	2%	-
Beverages	<1%	<1%	14%	13%	16%	13%	9%	8%
Crackers	-	-	1%	<1%	2%	2%	1%	<1%

After grains, fruits supplied the next largest amount of carbohydrate to male and female diets (Table 46). Fruits supplied 17% of the male carbohydrate intake and 22% of the female intake. Fresh fruits accounted for almost 60% of the total carbohydrate supplied by the fruit group for both males and females. Orange juice was more popular with males (30% of fruit CHO) than with females (20% of fruit CHO), with females tending to prefer the non-citrus fruits and juices.

Of the 12% of the carbohydrate provided by the dessert/sweet group for all subjects (Table 46), a major portion was from the syrup served at breakfast. Sixty percent of the male dessert/sweet carbohydrate intake and 56% of the female dessert/sweet carbohydrate intake came from pancake syrup. The beverage group was another significant source of refined carbohydrate. The primary carbohydrate source from this group was the Kool-Aid type beverage. Carbonated beverages were served in the dining facility, but the

dispensers were often inoperable. Even when the dispensers were working, very few of the trainees selected a carbonated beverage, which was a major departure from practices observed during previous USARIEM studies. Table sugar intake was minimal, accounting for less than 1% of total daily carbohydrate intake. Because of the ban on foods and snacks from the PX, candies and sweetened snack foods were not readily available to contribute to the refined sugar intake.

Dietary Fat: Intakes

Both the male and female mean total dietary fat intake for the study days was 34% of calories as fat (%FAT) (Table 42). This level of dietary fat intake was within the Army goal of <35%FAT (47). This is the first sample of soldiers to achieve this goal since USARIEM started to evaluate the impact of the nutrition initiatives (6,51,52). Attainment of this goal was probably assisted by dietary fat intakes of 25-29%FAT by 17% of the males and 23% of

Table 47. Distribution of Subjects at Different Levels of Percent Fat Calories of Total Energy Intake (%FAT) for Seven Days.

%FAT INTAKE LEVEL	MALE (N=41)				FEMALE (N=40)			
	N	(%)	KCAL MEAN±SD	FAT (g) MEAN±SD	N	(%)	KCAL MEAN±SD	FAT (g) MEAN±SD
25-29%	7	(17%)	3088±656	100±28.5	9	(23%)	2001±507	62±20.6
30-34%	18	(44%)	3042±706	110±33.8	12	(30%)	2566±473	90±24.2
35-39%	14	(34%)	3209±915	133±45.5	16	(40%)	2525±579	104±33.3
40-44%	2	(5%)	3843±1031	187±78.4	3	(7%)	2890±901	135±49.8

Although these subjects were eating foods prepared from a menu written in accordance with the Army Master Menu and AR 30-1, significant differences between the study menu and serving procedures at Ft. Jackson and those of previous studies made inferences difficult. However, the absence of variables such as a short order line and high fat, high calorie bakery products provided an opportunity for study not available in other dining facilities. Although the elimination of the short order line would not be possible due to its popularity, short order menu items (fast foods) are often significant sources of dietary fat. Other USARIEM dining facility studies have not reported the impact of short order menu items or bakery products on dietary fat intake. However, due to their popularity, fat content, and the frequency with which the items are served and selected, the assumption may be made that these items would impact greatly on dietary fat intakes.

The contribution of dietary fat to energy intake was the lowest at breakfast (males 30%FAT, females 29%FAT). Intakes of %FAT were between 33% and 39% for lunch and dinner meals. The highest intake (39%FAT) was at the mean female dinner meal (Table 42).

The relationship between energy intake and %FAT was examined to determine if individuals at higher levels of energy intake were consuming more calories as fat. A significant ($p < 0.001$) positive correlation was noted for females ($r = 0.57$) but not for males. Table 48 presents the relationship between total energy intake and macronutrient source. A significant ($p < 0.001$) and strong correlation existed between energy intakes and the absolute amount of fat intake ($r = 0.89$ for males, $r = 0.93$ for females). These data, along with the significant negative correlations for percent carbohydrate ($r = -0.39$, $p < 0.05$)

and percent protein ($r=-0.53$, $p<0.001$), indicated that females at the higher levels of energy intake were more likely to be getting these calories from fat. Females at the higher levels of %FAT intakes were consuming more of the foods which provide large amounts of dietary fat but little protein or carbohydrate, such as salad dressings and margarine. Food sources and their relation to levels of %FAT intake are discussed in following sections of this report.

Table 48. Correlation Between Energy and the Percent of Fat, Carbohydrate, and Protein Intakes of Total Energy Intake.

	%FAT ^a	%CHO ^b	%PRO ^c
<hr/>			
MALES (N=41)			
r	0.21	-0.04	-0.41
p	0.18	0.80	0.008
FEMALES (N=40)			
r	0.57	-0.39	-0.53
p	0.001	0.012	0.001

^a%FAT=Percent of total energy from fat.

^b%CHO=Percent of total energy from carbohydrate.

^c%PRO=Percent of total energy from protein.

While the females with the higher intakes of %FAT were more likely to be at the higher levels of energy intake, males were not. Males with higher intakes of %FAT were found at all levels of energy intake. A nonsignificant correlation between male percent carbohydrate intake and energy intake and a significant but moderately negative correlation ($r=-0.41$, $p<0.01$) between percent protein and energy indicated that males at different levels of energy

intake with a higher %FAT, were not consuming exclusively high fat foods as were the females at these levels.

To determine if variations in fat intake were affecting the intakes of other nutrients, the mean nutrient intakes at different %FAT intake levels were examined. This analysis was performed for those nutrients where inadequate nutrient intakes were noted and could be linked to consumption of foods which would provide large amounts of dietary fat (Table 49). For instance, reduced fat intakes may be the result of a reduced consumption of dairy products which could lead to lower calcium intakes.

Table 49. Mean Dietary Intakes of Selected Nutrients by Individuals Consuming Different Levels of Dietary Fat as Calories (%FAT).

NUTRIENT	%FAT LEVEL	MALE		FEMALE	
		N	MEAN±SD	N	MEAN±SD
Calcium (mg) MRDA: 800-1200	25-29%	7	1210±541	9	746±394
	30-34%	18	1196±556	12	866±321
	35-39%	14	1416±762	16	977±496
	>40%	2	2537±1119	3	858±302
Iron (mg) MRDA: male 10-18 female 18	25-29%	7	21.9±5.2	9	17.9±8.5
	30-34%	18	22.9±7.9	12	18.5±7.8
	35-39%	14	25.1±11.0	16	17.8±6.4
	>40%	2	22.7±7.3	3	17.5±4.6
Vitamin A (mcg RE) MRDA: male 1000 female 800	25-29%	7	2277±2733	9	1533±1201
	30-34%	18	2347±2427	12	2042±1703
	35-39%	14	1831±1634	16	1440±1099
	>40%	2	1418±435	3	1580±1024
Vitamin B ₁₂ (mcg) MRDA: 3.0	25-29%	7	4.86±2.08	9	2.98±1.44
	30-34%	18	4.52±1.92	12	3.66±1.42
	35-39%	14	5.19±2.48	16	3.81±1.64
	>40%	2	8.17±1.33	3	3.71±1.14

Mean nutrient intakes for males at each of the different levels of %FAT intake met or exceeded the MRDA. However, the mean nutrient intakes of calcium and Vitamin B₁₂ were inadequate in females at the 25-29%FAT level. Overall, female calcium intakes were low (Table 49), but mean calcium intakes at the 25-29%FAT level never attained the lower limit of the MRDA for calcium (800 mg/day). These data suggested that on the average, very few females at the 25-29%FAT level were consuming dairy products. Mean intakes of Vitamin B₁₂ by females consuming diets at the 25-29%FAT level were right at the recommended level (Table 49). This suggested that lower dairy product consumption as well as lower egg consumption may have contributed in part to inadequate Vitamin B₁₂ intakes since these foods are major sources of this vitamin.

In general, the results in this table show that above the 30%FAT level, a sufficient variety of foods were eaten to provide sufficient vitamins and minerals. However, reducing the %FAT in the diet to less than 30% may lead to inadequate intakes of certain vitamins and minerals if caution is not taken to ensure that these soldiers are eating a well-balanced diet. These data show that some females may be at risk for inadequate calcium and Vitamin B₁₂ intakes when reducing their fat intake.

Serum Total Cholesterol Levels and Current Fat Intakes

A significant correlation between serum total cholesterol levels and current dietary fat intakes was not found. However, a significant correlation was not expected since the subjects participating in this study were at an age where blood lipid levels are normally at their lowest. The National

Cholesterol Education Program Expert Treatment Panel states that serum total cholesterol levels can be expected to increase after the age of 20 years (19).

Since the analysis of the total sample was affected by the age-induced low serum total cholesterol levels, only individuals with serum total cholesterol levels in excess of 180 mg/dl were examined (Table 50). There were six males

Table 50. Mean Dietary Percent Protein, Percent Fat, Percent Carbohydrate, and Cholesterol (mg) Intakes for Individual Subjects With Serum Total Cholesterol Levels Over 180 mg/dl.

GENDER	SERUM TOTAL CHOLESTEROL	MEAN KCAL±SD	%PRO ^a	%FAT ^b	%CHO ^c	DIETARY CHOLESTEROL (mg)
Male	180-189 mg	3377±680	16%	37%	49%	562
		3524±611	14%	39%	48%	889
	190-199 mg	3229±586	17%	40%	45%	580
		3963±494	15%	29%	57%	855
	>200 mg	1973±591	19%	38%	43%	534
		4249±783	15%	37%	50%	858
Female	180-189 mg	2733±263	13%	33%	55%	234
		2882±429	14%	36%	51%	409
		2882±278	14%	32%	55%	711
		2298±387	16%	34%	52%	228
		2749±408	15%	39%	48%	540
		2749±408	15%	39%	48%	540
	190-199 mg	3479±338	17%	38%	52%	424
		2694±204	17%	37%	48%	273
		2733±289	17%	35%	48%	587
		2199±909	16%	34%	51%	411
	>200 mg	2274±706	16%	36%	49%	601
		2156±447	14%	30%	57%	188

^a%PRO=Percent of total energy from protein.

^b%FAT=Percent of total energy from fat.

^c%CHO=Percent of total energy from carbohydrate.

and eleven females that met this criterion. Dietary fat intakes and/or dietary cholesterol intakes for almost all of these subjects were at levels predictive of elevated blood lipid levels. All but one of the males had dietary fat intakes in excess of 35%FAT. However, the male with the low level of dietary fat intake had a mean dietary cholesterol intake of 855 mg. Six of the eleven female subjects had fat intakes exceeding 35%FAT, with the remainder having fat intakes between 30-35%FAT. Dietary cholesterol intakes in excess of 300 mg/dl were found for seven of these females. While a direct cause/effect relationship in this case cannot be concluded, traditional beliefs appear to be upheld.

Dietary Fat: Major Food Sources

The contributions of menu items from the major food groups to total fat intake for the seven days were determined. These results are presented in Table 51 and Figure 9. Major sources of dietary fat included the meat/entree, table fat, dairy, and grain food groups. Overall, menu items from these food groups contributed 83% of the male and female total dietary fat intakes.

Fats from the food items composing the meat/entree and dairy groups are high in saturated fats. Since meat/entree foods provided the greatest amount of available fat in the menu (Appendix M, Tables M-4 and M-5), the fact that this group also contributed the most to fat intakes was not surprising. Foods from the meat/entree major food group contributed almost half of both the male and female total fat intakes (male 45%, female 45%). The contributions of specific meat subgroups are presented in Table 52.

Figure 9
PERCENT CONTRIBUTIONS OF MAJOR FOOD GROUPS
TO TOTAL FAT INTAKE FOR SEVEN DAYS

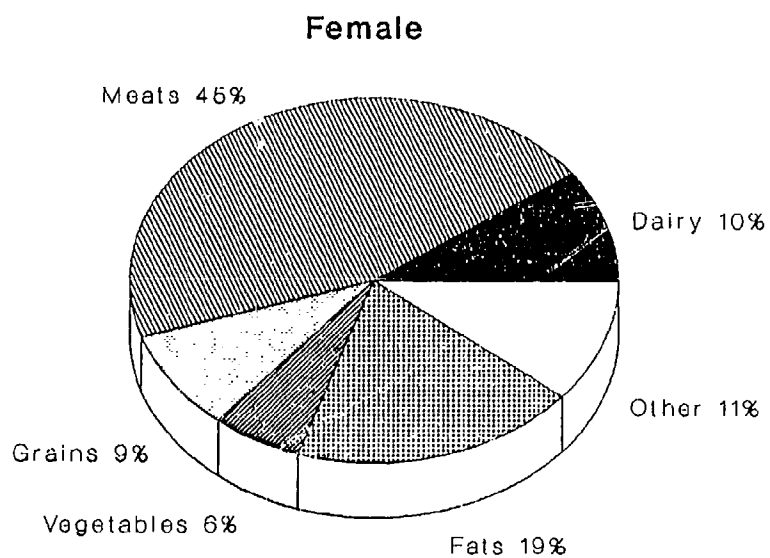
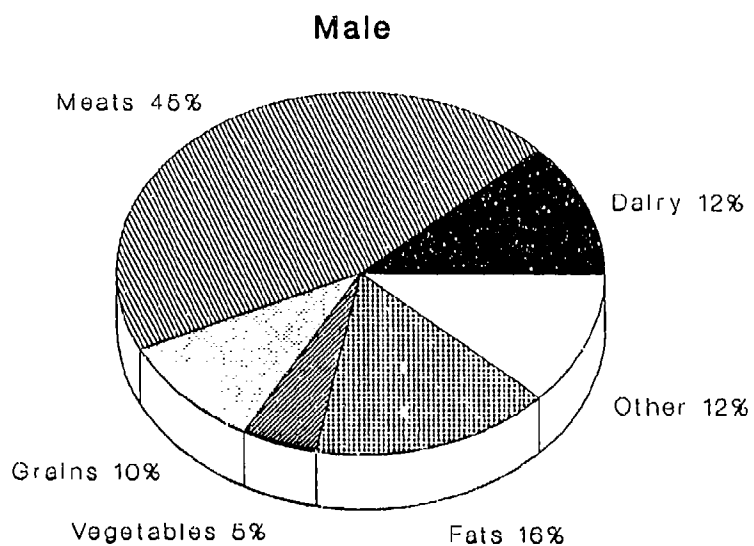


Table 51. Percent Contributions of Major Food Groups to TOTAL FAT Intake for Seven Days at Breakfast, Lunch, and Dinner.

MAJOR FOOD GROUP	BREAKFAST		LUNCH		DINNER		TOTAL	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
Dairy	10% ^a	11%	10%	6%	15%	13%	12%	10%
Meat/Entree	56%	43%	42%	49%	40%	43%	45%	45%
Grains	11%	10%	7%	8%	13%	10%	10%	9%
Peanut Butter	8%	17%	-	-	-	-	2%	5%
Vegetables	4%	5%	6%	5%	6%	7%	5%	6%
Fruits	1%	2%	<1%	<1%	<1%	<1%	<1%	1%
Desserts/Sweets	<1%	<1%	8%	11%	-	-	3%	4%
Table Fats	10%	12%	15%	20%	22%	25%	16%	19%
Condiments	-	-	<1%	<1%	2%	<1%	<1%	1%
MRE	-	-	9%	-	-	-	3%	-
Beverages	-	-	-	-	-	-	-	-
Crackers	-	-	1%	<1%	2%	1%	<1%	<1%

^aPercentages have been rounded to nearest whole number and therefore may not add up to 100%.

Table 52. Overall Contributions of Meat/Entree Minor Food Groups to Total Meat/Entree Contributions to Dietary Fat Intakes.

MINOR FOOD GROUP	% CONTRIBUTION TO MAJOR FOOD GROUP FAT CONTRIBUTION	
	MALE	FEMALE
Eggs	18%	10%
Veal	14%	10%
Sausage	13%	14%
Bacon	11%	14%
Pork	10%	10%
Combination Dishes	9%	13%
Cured Meats	6%	6%
Chicken	6%	8%
Beef	6%	7%
Soy Extended Beef	3%	3%
Fish	2%	3%
Turkey	2%	3%

The contributions to dietary fat by these meat subgroups have been expressed as the percent contribution of the specific subgroup to the total meat/entree (major group) fat contribution, not to the total fat intake for seven days. Mixed dishes such as Beef Stew, Lasagna, Chili, etc. were pooled and included as combination dishes.

The five meat subgroups contributing the most to the meat/entree dietary fat intake for the seven days were eggs, veal, bacon, sausage products, and pork. Combined, these meat subgroups contributed more than 50% of both the male and female dietary fat intakes from meat/entrees (Table 52). Although the %FAT contribution was the lowest at breakfast (Table 42), breakfast meats (eggs, bacon, sausage products) combined, contributed a substantial portion of the dietary fat intake for the seven days. The frequency with which these menu items were offered (daily), the high selection rate, and their inherent high fat content contributed to this fact.

Egg consumption by males accounted for almost one fifth (18%) of the male fat intake from the meat/entree group (Table 52). Female fat intakes were less affected by egg consumption, however, eggs did play a significant role (10%). Visible egg consumption between males and females was significantly different ($p < 0.05$) prior to basic training and during basic training (Tables 25 and 53). Visible egg consumption was measured by determining the total number of eggs eaten by individuals during the seven days (Table 53). More than ten visible eggs were eaten by 73% of the male subjects, while only one male (2%) did not eat any eggs at all. The females had lower fat intakes since only 25% of the females were consuming more than ten eggs per week and 25% of the females did not eat any eggs. Generally, egg consumption prior to

basic training was reportedly lower than during basic training for both males and females (Tables 25 and 53). Possible reasons for lower egg consumption prior to basic training may have been: fewer individuals ate the breakfast meal, eggs were not purchased in the home, and/or no one was available to prepare the eggs in the home. Mandatory attendance at breakfast and the daily exposure to eggs during basic training may have influenced the trainees to increase their intake. However, the females did not appear to change their eating habits since the percent of females not eating eggs (20%) prior to basic training was similar to the number not eating eggs (25%) during basic training.

Table 53. Count of Visible Egg Consumption for Seven Days.

NUMBER OF EGGS	MALE (N=41)	FEMALE (N=40)
	N (%) ^a	N (%)
0	1 (2%)	10 (25%)
1-2	1 (2%)	9 (23%)
3	0	1 (2%)
4-6	3 (7%)	6 (15%)
7-10	6 (15%)	4 (10%)
>10	30 (73%)	10 (25%)

^aPercentages have been rounded to the nearest whole number and therefore may not add up to 100%.

^b#=Significant differences between males and females at $p < 0.05$.

Veal provided 14% of the male and 10% of the female meat contribution to total dietary fat intake. Actually, only a frozen commercially prepared breaded veal steak was included in this minor meat category. The frequency

with which this item appeared on the study menu (5 out of 14 meals) was similar to the frequency with which it is served throughout the Army. During another dining facility study this product was served 8 times in 14 meals (51). The reason for its frequent appearance is that breaded veal steaks were often served as a menu item replacement or supplement when, because of errors in forecasting or deficient food deliveries, the primary menu item was not available in sufficient quantities. The extensive use of this item is due to the minimum time and preparation needed to take the item from the freezer to the serving line and to its acceptability. However, since the item is deep fat fried, a substantial amount of fat is contributed to the diet by the breaded veal steak.

After foods from the meat/entree group, menu items from the table fat food group were the next leading source of dietary fat (Table 51). These foods contributed approximately one fifth of both the male (16%) and female (19%) total fat intakes. Overall, the table fat group contributed more dietary fat at lunch and dinner than at breakfast. However, if melted margarine had been served with pancakes, waffles, and french toast, as had been done in other garrison dining facility studies, table fat contributions to total dietary fat may have been higher (6,51,52).

Specific items included in the table fat group were: margarine, salad dressings, gravies, olives, sour cream, and coffee whitener. The contributions of margarine, salad dressing, and gravies to the table fat group contribution to total fat intake are presented in Table 54. The contributions of olives, sour cream, and coffee whitener were minimal (<1%).

Margarine provided over half of the table fat group contribution to total fat intakes for both males and females. Salad dressings accounted for 38% and 31% of the male and female table fat group intakes, respectively. The large contribution of salad dressings is interesting because: many subjects had stated that they wanted to lose weight (Table 8), the low calorie dressings were served adjacent to the regular dressings, and the questionnaire revealed

Table 54. Overall Contributions of Selected Fat Items to Table Fat Group Contribution to Total Dietary Fat Intakes.

MINOR FOOD GROUP	% CONTRIBUTION TO TABLE FAT GROUP CONTRIBUTION TO TOTAL DIETARY FAT	
	MALE	FEMALE
Margarine	51% ^a	58%
Salad Dressing	38%	31%
Gravy	11%	10%

^aPercentages have been rounded to the nearest whole number and therefore may not add up to 100%.

that subjects knew that low calorie dressings were better than regular salad dressings for losing weight (Table 16). Personal food preference appeared to play a big part in salad dressing choices. Overall, gravies accounted for less than 2% of the total fat intake for the seven days (11% of male table fat group contribution, 10% of female table fat group intake). Although gravies were not listed on the Army Master Menu, they were served two meals a day in this dining facility, which could have had a large impact on total fat intake. However, the data suggest that gravies actually contributed very little to

total fat intake. Unlike the menu items from the meat group, subjects were able to take as much margarine or salad dressing as desired and this seems to be reflected in the large proportion of these fats in the table fat group compared to gravy which was served.

Dairy products were the third largest contributor to total dietary fat intakes (Table 51). The consumption of dairy products accounted for 12% of total fat intake for males and 10% for females. Contributions of different dairy products to the dairy food group contribution to total fat intakes are presented in Table 55. Over half of the dairy fat contribution was provided by milk beverages. Types of milk consumed and mean intakes were discussed in a previous section on Nutritional Adequacy during the discussion on calcium intake (Tables 35 and 36). Cheeses (cheddar and cottage cheese) were significant dairy food group sources of dietary fat (46% males, 41% female).

Table 55. Overall Contributions of Dairy Items to the Dairy Major Food Group Contributions to Total Dietary Fat Intakes.

	% CONTRIBUTION TO DAIRY GROUP CONTRIBUTION TO TOTAL DIETARY FAT	
	MALE	FEMALE
Milk Beverages	52%	56%
Natural Cheeses	46%	41%
Yogurt	2%	3%

Menu items from the grain group accounted for 10% and 9% of the total male and female dietary fat intakes, respectively (Table 51). Only 40% of the

dietary fat was attributed to the addition of fats or oils during the cooking process. The remaining 60% came from the consumption of foods such as commercially prepared breads, waffles, pancake mix, etc.

Foods Contributing to Higher Fat Intakes

The conclusion was reached that high levels of %FAT were not directly the fault of the food service system (menu, recipes, preparation, etc.) but were the result of individual food selection and consumption patterns. This conclusion was supported by the fact that over 50% of both males and females were able to meet the MRDA target for fat intake <35% without experiencing inadequate intakes of other important nutrients. As a result of this conclusion, further investigation focused on the differences in the contributions of major food groups at the different levels of fat intake.

The amount of dietary fat resulting from the consumption of menu items from the major food groups was determined per 1000 kcal of energy intakes to compare fat intakes at different levels of %FAT. These results are presented in Tables 56 and 57 for males and females, respectively. This method was used to adjust for the fact that high and low %FAT intakes were found throughout the range of energy intakes. The percent of the major food groups' contribution to total fat intake also was determined. Food groups contributing minimal dietary fat were eliminated from this comparison. The percent contribution of major food groups to total dietary fat intake are depicted in Figures 10 and 11. The data in Tables 56 and 57 are slightly different from those in Figures 10 and 11 because of the different methods of

Table 56. Fat Intake (g) per 1000 kcal and Percent Total Fat Intake Provided by Selected Major Food Groups at Different Levels of Percent Fat of Calories (%FAT) for MALES.

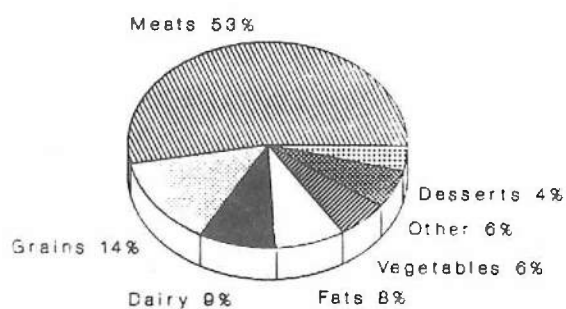
MAJOR FOOD GROUP	LEVELS OF %FAT INTAKE							
	25-29%FAT (N=7)		30-34%FAT (N=18)		35-39%FAT (N=14)		>40%FAT (N=2)	
	Fat(g)/ 1000kcal	%Total Fat	Fat(g)/ 1000kcal	%Total Fat	Fat(g)/ 1000kcal	%Total Fat	Fat(g)/ 1000kcal	%Total Fat
<-----per 1000 kcal----->								
Dairy	3	9%	4	10%	5	13%	12	25%
Meat/Entree	17	53%	17	46%	17	43%	16	35%
Grains	4	14%	4	11%	4	9%	2	4%
Vegetables	2	6%	2	6%	2	4%	2	4%
Peanut Butter	-	-	1	2%	1	2%	3	6%
Dessert/Sweets	1	4%	1	3%	1	2%	1	3%
Table Fats	3	9%	5	15%	8	20%	9	19%

Table 57. Fat Intake (g) per 1000 kcal and Percent of Total Fat Intake Provided by Selected Major Food Groups at Different Levels of Percent Fat of Calories (%FAT) for FEMALES.

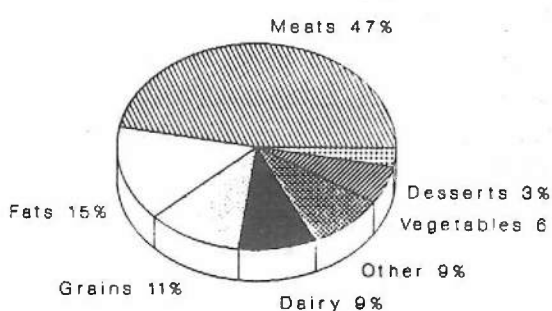
MAJOR FOOD GROUP	LEVELS OF %FAT INTAKE							
	25-29%FAT (N=7)		30-34%FAT (N=18)		35-39%FAT (N=14)		>40%FAT (N=2)	
	Fat(g)/ 1000kcal	%Total Fat	Fat(g)/ 1000kcal	%Total Fat	Fat(g)/ 1000kcal	%Total Fat	Fat(g)/ 1000kcal	%Total Fat
<-----per 1000 kcal----->								
Dairy	3	10%	3	9%	5	12%	3	7%
Meat/Entree	17	54%	18	48%	17	40%	19	41%
Grains	4	12%	3	9%	3	8%	3	7%
Vegetables	2	5%	2	6%	2	5%	2	5%
Peanut Butter	<1	<1%	1	3%	4	9%	1	2%
Dessert/Sweets	1	3%	2	4%	2	4%	2	5%
Table Fats	4	12%	7	17%	9	20%	15	32%

Figure 10
PERCENT CONTRIBUTIONS OF MAJOR FOOD
GROUPS AT DIFFERENT FAT INTAKE
LEVELS OF MALES

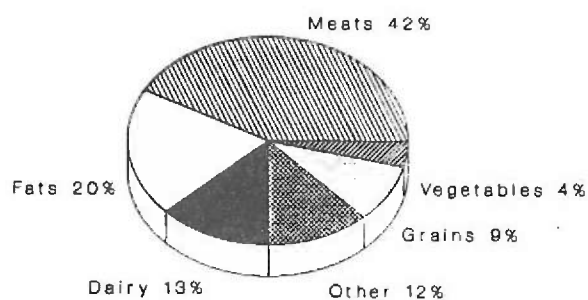
25-29% KCAL FROM FAT



30-34% KCAL FROM FAT



35-39% KCAL FROM FAT



40-44% KCAL FROM FAT

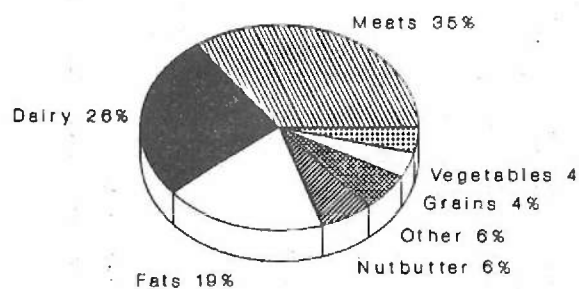
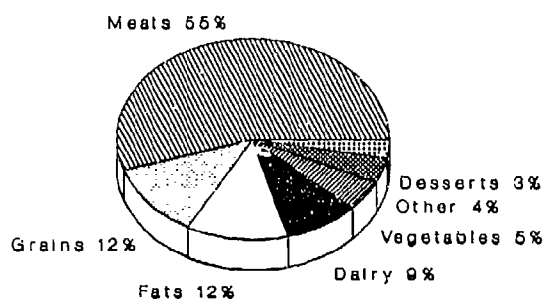
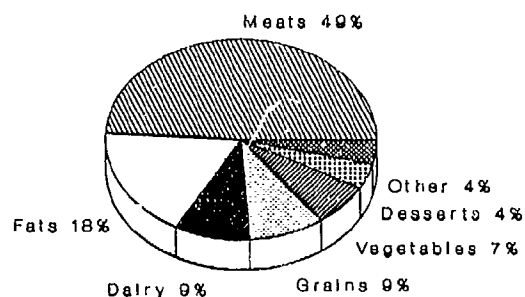


Figure 11
PERCENT CONTRIBUTIONS OF MAJOR FOOD
GROUPS AT DIFFERENT FAT INTAKE
LEVELS OF FEMALES

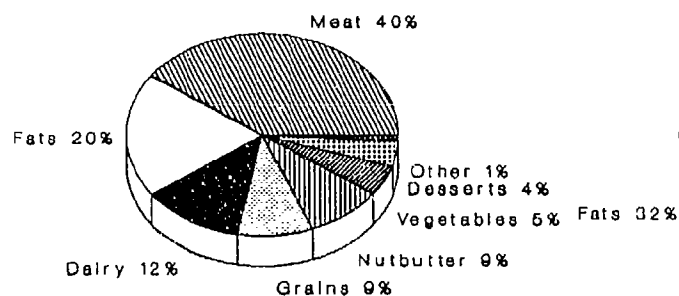
25-29% KCAL FROM FAT



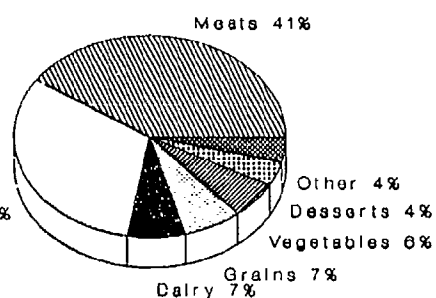
30-34% KCAL FROM FAT



35-39% KCAL FROM FAT



40-44% KCAL FROM FAT



calculating the percent total fat (per 1000 kcal vs. percentage of consumption).

These data revealed an interesting trend. Absolute fat intakes (Fat (g)/1000 kcal) originating from those groups where subjects had minimal control over portion sizes were similar at all levels of %FAT intake. Generally, menu items from the meat/entree, grain, vegetable, and dessert/sweet groups did not vary more than 2 g fat per 1000 kcal intake. The major difference between individuals consuming diets containing <35%FAT or >35%FAT was in the amount of fat which came from the dairy group, table fat group, and peanut butter. Subjects were able to take items from these food groups without any limits.

Peanut butter is often suggested as a good replacement for meats. However, these data suggest that males and females at fat intake levels >35% were not using peanut butter as a substitute for meats, but were eating it in addition to meats (Tables 56 and 57). The frequency with which peanut butter was selected during the study and the median portions in which it was consumed are presented in Table 58. These results indicate that individuals consuming levels >35%FAT were taking peanut butter more frequently and consuming larger quantities than individuals at <35%FAT. Males consumed peanut butter less frequently than females, however the average portion for males was almost twice as large as for females.

Five meat subgroups: eggs, veal, sausage, bacon, and pork (Table 59), were primarily responsible for the majority of the male meat/entree group fat intakes. While the relative rank of each meat subgroup changed at different

Table 58. Comparison of Selection and Consumption Rates of Peanut Butter at Different Levels of %FAT^a Intake.

GENDER	%FAT LEVELS					
	25-29%FAT		30-34%FAT		>35%FAT	
	SELECTION FREQUENCY	AMOUNT ^b EATEN (g)	SELECTION FREQUENCY	AMOUNT EATEN (g)	SELECTION FREQUENCY	AMOUNT EATEN (g)
Males	--	--	12	40	18	64
Females	1	9	9	25	54	32

^a%FAT=Percent of total energy from fat.

^bMedian Intake.

Table 59. Overall Contributions of Minor Food Groups to Meat/Entree Food Group Contributions to Total Dietary Fat Intakes at Different Levels of %FAT^a Intake by MALES.

MINOR FOOD GROUP	LEVELS OF %FAT INTAKE							
	25-29%FAT		30-34%FAT		35-39%FAT		>40%FAT	
	%Total	Rank	%Total	Rank	%Total	Rank	%Total	Rank
Eggs	15%	1	19%	1	17%	1	20%	3
Veal	14%	2	14%	2	12%	3	23%	1
Sausage	13%	3	10%	4	17%	1	5%	6
Bacon	12%	4	9%	5	11%	4	22%	2
Pork	9%	5	13%	3	9%	5	7%	4
Chicken	8%	6	5%	7	7%	6	2%	8
Combination	8%	6	6%	6	7%	6	4%	7
Cured Meats	7%	7	5%	7	7%	6	5%	6
Beef	5%	8	6%	6	5%	7	7%	5
Soy Ext Beef	3%	9	4%	8	2%	8	5%	6
Turkey	2%	10	2%	10	2%	8	<1%	10
Fish	2%	11	3%	9	2%	8	1%	9

^a%FAT=Percent of total energy from fat.

^bPercentages have been rounded to the nearest whole number and therefore may not add up to 100%.

%FAT levels for males, their combined contributions remained approximately the same with one exception. Males consuming %FAT levels >40% had large increases in dietary fat from veal and bacon. These increases may, in part, explain the higher absolute fat intake of this group (Table 47).

Differences in the meat/entree consumption patterns for females at different levels of %FAT intake were more pronounced than for males (Table 60).

Table 60. Overall Contributions of Minor Food Groups to Meat/Entree Food Group Contributions to Total Dietary Fat Intakes at Different Levels of %FAT^a Intake by FEMALES.

MINOR FOOD GROUP	LEVELS OF %FAT INTAKE							
	25-29%FAT		30-34%FAT		35-39%FAT		>40%FAT	
	%Total	Rank	%Total	Rank	%Total	Rank	%Total	Rank
Combination	23%	1	11%	2	10%	4	5%	7
Pork	11%	2	11%	3	10%	4	8%	5
Chicken	9%	2	7%	5	7%	5	12%	4
Sausage	9%	2	11%	3	17%	1	22%	1
Bacon	9%	2	19%	1	14%	2	6%	6
Cured Meats	7%	3	6%	5	5%	6	2%	9
Veal	6%	4	10%	4	10%	4	15%	3
Beef	6%	4	6%	6	7%	5	6%	6
Fish	6%	4	3%	7	2%	9	2%	9
Eggs	6%	4	10%	4	11%	3	16%	2
Turkey	3%	5	3%	7	3%	8	1%	10
Soy Ext Beef	2%	6	3%	7	4%	7	4%	8

^a%FAT=Percent of total energy from fat.

Females at the two lower levels of fat intake obtained more dietary fat from combination dishes where ingredients other than meat tended to lower the

dietary fat content of the recipe. Females at the 25-29%FAT level also appeared to consume a wider variety of food choices, with very few items accounting for more than 10% of their meat/entree fat intakes. As the level of female fat intake increased so did the contributions of the higher fat meats such as sausage, bacon, veal, and eggs, generally. Decreases in the percent contributions of the lower fat meats such as combination dishes, fish, and to a lesser extent, chicken were noted as fat intakes increased. The increased consumption of meats higher in fat (i.e., sausage, eggs, bacon) also explained the increase in the average fat intakes of females at higher levels of %FAT intake (Table 47).

These results indicate that males at most levels of %FAT intakes were consuming about equal amounts of dietary fat from the meat/entree group. Males at the 25-29%FAT level were not selecting or consuming high fat meats (eggs, bacon, sausage products) as often as males at higher %FAT intakes. Overall, most of the male fat intake was attributable to single ingredient menu items such as bacon, sausage, etc. These items were major fat sources because of the frequency with which these items were served, their inherent fat content, and their overall popularity. Little could be done to alter male fat intakes unless these items were served less frequently or in smaller portions. Another suggestion would be to serve lower fat menu items providing equal acceptance and palatability. Yogurt and other low fat alternatives seemingly do not offer equal value to the customer in terms of acceptability. One reason that yogurt and other items from the breakfast bar may not have been selected could be related to the location of the breakfast bar at the end of the serving line out of the flow of traffic. Although this location may have reduced selection

rates, the effect was believed minimal, since subjects were aware of its position. Instead, location should have been a positive factor, since the subjects would not have had to wait in line to be served.

Female fat intakes were more influenced by the meat/entree group. Females with %FAT intakes <35% were selecting and consuming fewer eggs and other high fat meat items. Overall, female average fat intakes were less than that of males (Table 47), which was attributable to lower selection rates of high fat items such as eggs and lower consumption of these items in general. For females, the plate waste for dietary fat and cholesterol (eggs) was higher (Table 31) than for males. Females with %FAT intake >35%FAT were consuming with equal frequency, although in smaller amounts, the same high fat meat items as males. In addition, females were consuming more combination dishes which helped in lowering overall fat intake.

With increasing levels of %FAT intake, the percent contributions of the grain group to total fat intake decreased, but the absolute amount of fat consumed remained approximately the same (Tables 56 and 57). Fat intakes from the grain group were generally from commercially produced foods or where minimal recipe manipulation were needed. On the average, 60-70% of both the male and female fat intakes from the grain group were attributable to dry cereals, pancakes (from mix), waffles (commercial), french toast, and commercial bread products. Menu items (rice, pastas, cooked cereals) to which fat was added during the cooking process or before serving, had minimal effect on overall fat intake or %FAT intake levels. However, the fat content of these products was often variable (Appendix N, Table N-5).

The percent contribution of vegetables to total fat intakes remained fairly constant at the different levels of %FAT intake (Tables 56 and 57). Overall, potatoes contributed approximately 65% of the male and female fat intakes from vegetables. At increasing levels of %FAT intake, the relative contributions from potatoes increased from 70% (25-29%FAT) to 87% (>40%FAT) for males and from 65% to 74% for the females, respectively. Often, vegetable and starch cookery in the Army centers around the addition of some sort of fat, either in the cooking medium or for flavoring. Potatoes served at Fort Jackson reflected this practice. Hash brown potatoes, rissole potatoes, oven brown potatoes, and french fries were very popular, but also provided significant amounts of dietary fat. Since little change can be made to the recipes without affecting the final product, the answer might be to limit the frequency that they are served. However, serving these items less frequently may affect overall customer satisfaction, especially at dining facilities where french fries are served daily. The total fat contributed by these items at Fort Jackson was relatively small, since there was no short order line. The effects of these potato items at other dining facilities is unknown. Vegetables other than potatoes provided very little fat, since most vegetables were steamed or boiled and served without added margarine.

Although fat from potatoes may have influenced dietary fat intakes, other food groups had more of an effect. Contributions to total fat intake by menu items from the dairy group and the table fat group increased dramatically as the %FAT intakes increased (Tables 56 and 57). As previously mentioned, subjects had free access to these items.

The replacement of whole milk by 2% low fat milk has been helpful in lowering the overall fat intakes of soldiers. However, soldiers consuming low fat milk and other dairy products in excess of the amount required to meet the calcium requirements in the MRDA were placing themselves at %FAT intakes >35%. Table 61 presents the contributions of dairy minor food groups to total dairy fat intakes at different levels of %FAT intake.

Table 61. Percent Contributions of Selected Dairy Minor Food Groups to Total Dairy Fat Intakes at Different Levels of %FAT^a Intake.

MINOR FOOD GROUP	LEVELS OF %FAT INTAKE			
	25-29%FAT % TOTAL ^b	30-34%FAT % TOTAL	35-39%FAT % TOTAL	>40%FAT % TOTAL
MALE				
Milk Beverages	79%	56%	41%	56%
Cheese	17%	41%	58%	44%
Yogurt	4%	3%	1%	---
FEMALE				
Milk Beverages	65%	63%	55%	21%
Cheese	24%	35%	42%	78%
Yogurt	11%	2%	3%	2%

^a%FAT=Percent of total energy from fat.

^bPercentages have been rounded to nearest whole number and therefore may not add up to 100%.

Male and female subjects at >35%FAT levels were not only drinking milk more frequently but also consuming larger median portions (Table 62). Surprisingly, skim milk consumption was less for females than males. Cheese also was consumed more frequently by soldiers at %FAT intakes >35%. Cheddar cheese was

served three different ways during the study: shredded, cubed, and as a block (self service). The cheddar cheese consumption presented in Table 62 represents only the cubed cheese consumption. Interestingly, when a block of cheese was used, fewer individuals took the item, however, median portions were larger. Low fat cottage cheese was not served at Fort Jackson. However, cottage cheese consumption had minimal impact on fat intakes, because the frequency of cottage cheese selection (34 times) was substantially lower than that of cheddar cheese during the entire study.

Table 62. Comparison of Selection and Consumption Rates of SELECTED DAIRY PRODUCTS at Different Levels of %FAT^a Intake.

DAIRY PRODUCT	%FAT LEVELS					
	25-29%FAT		30-34%FAT		>35%FAT	
	SELECTION FREQUENCY	AMOUNT ^b EATEN(g)	SELECTION FREQUENCY	AMOUNT EATEN(g)	SELECTION FREQUENCY	AMOUNT EATEN(g)
MALES						
2% White Milk	32	244	67	305	85	355
2% Choc Milk	23	344	40	344	51	344
Skim Milk	2	30	6	240	5	240
Cheddar Cheese	6	32	15	36	33	36
FEMALES						
2% White Milk	28	244	64	289	100	274
2% Choc Milk	19	281	18	313	37	359
Skim Milk	--	--	1	150	4	240
Cheddar Cheese	5	27	14	23	42	23

^a%FAT=Percent of total energy from fat.

^bMedian intake

These results clearly indicate that without the use of 2% milk, fat intakes would have been much higher. The basic trainees may have been drinking a low fat milk, but the quantities that some individuals were consuming and the consumption of other high fat dairy products contributed to fat intakes that were >40%FAT. The answer to the problem may be found in nutrition education programs which stress the importance of low fat foods but advise moderation in their consumption and/or use of lower fat alternatives such as skim milk.

The consumption of foods from the table fat group had a major impact on total fat intakes (Table 51). Generally, these foods are used to increase the overall palatability of other foods such as salads, breads, potatoes, meats, etc. However, excessive intakes may be reached easily. Often, individuals are not aware of the calories or the amount of fat provided by a relatively small portion of margarine or salad dressing. The results of the nutrition knowledge test indicated that these subjects knew very little about fat and its food sources (Tables 10 and 11).

Margarine and salad dressings were the major contributors from the table fat food group to total fat intakes (Tables 63 and 64). Gravies, which were served at almost every meal, had a minimal effect on fat intakes. However, unlike margarine and salad dressings, gravies were not a self-service item. Also, since gravies were not uniformly prepared, contributions to total fat intakes may have been significantly different at the meals where gravies with higher proportions of fat were served (Appendix N, Table N-5).

A reduction in the frequency with which gravies and other high fat sauces appear on the Master Menu will lower total fat intakes on paper. However, the

Table 63. Percent Contributions of Selected Fats from the Minor Food Groups to Total Fat Intakes at Different Levels of %FAT^a Intake.

MINOR FOOD GROUP	LEVELS OF %FAT INTAKE			
	25-29%FAT % TOTAL	30-34%FAT % TOTAL	35-39%FAT % TOTAL	>40%FAT % TOTAL
MALE				
Margarine	35%	62%	40%	76%
Salad Dressing	43%	27%	52%	13%
Gravy	22%	12%	9%	11%
FEMALE				
Margarine	46%	63%	55%	64%
Salad Dressing	35%	25%	36%	28%
Gravy	18%	11%	9%	8%

^a%FAT=Percent of total energy from fat.

results of this study, as well as those of other dining facility studies, indicated a reluctance on the part of the local menu planners to implement this initiative. This conflict may be the result of local menu planners knowing the preferences and expectations of military diners. Part of this conflict may be resolved by the introduction of lower fat sauces, which offer the military diner the same level of acceptance and palatability as the higher fat gravies. Sauces thickened with cornstarch or prepared from low fat dairy products could be developed to fill the gap between diners' expectations and total elimination of the food as advocated on the Master Menu.

Salad dressings present a similar dilemma. The frequency with which salad dressings were selected and the median portions of the salad dressings are presented in Table 64. The salad dressings selected for this comparison do

not represent total salad dressing consumption, but are representative of trends observed for all salad dressings.

Table 64. Comparison of Selection and Consumption Rates of SELECTED FATS at Different Levels of %FAT^a Intake.

SELECTED FATS	%FAT LEVELS					
	25-29%FAT		30-34%FAT		>35%FAT	
	SELECTION AMOUNT ^b FREQUENCY EATEN(g)		SELECTION AMOUNT FREQUENCY EATEN(g)		SELECTION AMOUNT FREQUENCY EATEN(g)	
MALES						
Margarine	20	10	146	10	148	10
French Dressing	8	23	16	15	26	15
1000 Island Drsg	4	26	5	22	9	50
Italian Drsg	1	36	25	24	39	36
Low Calorie Drsg	2	49	9	37	9	37
FEMALES						
Margarine	39	5	116	10	203	10
French Drsg	8	14	8	15	20	15
1000 Island Drsg	7	25	8	29	46	24
Italian Drsg	1	45	17	24	21	28
Low Calorie Drsg	--	--	2	18	9	24

^a%FAT=Percent of total energy from fat.

^bMedian Intake.

Salad dressings greatly enhance the enjoyment of the raw vegetables that are served on the salad bar. Unfortunately, excessive consumption of fat-based salad dressings negate the benefits of low calorie raw vegetable consumption. The impact of salad dressings on salad consumption was analyzed and discussed in Appendix M, Table M-6. During the present study, individuals with fat intakes exceeding 35%FAT were consuming salad dressings with greater

frequency and/or in greater amounts (Table 64). Low calorie salad dressings were not very popular. However, a great number of other commercially prepared low fat salad dressings are currently available and should be investigated for acceptability. Other possible solutions could lower salad dressing use either voluntarily or involuntarily. Procedures to involuntarily restrict salad dressing use, such as removing it as a self service item, probably would be highly unpopular. A degree of success may be achieved through nutrition education programs which advocate voluntary restriction; however, this may not totally solve the problem for those individuals who enjoy large quantities of salad dressing on their raw vegetables.

Individuals with total fat intakes greater than 35%FAT were consuming margarine more frequently (Table 64). Unfortunately, this study cannot provide information about the foods to which margarine was added. Future USARIEM studies should determine whether margarine/butter is being added to vegetables, potatoes, and/or bread. Greater use of margarine on items other than bread would support a need for a greater use of flavor enhancers in vegetables and other starchy foods. Since the Nutrition Knowledge section of this technical report showed that very few individuals are knowledgeable about the calories and type of fat provided by this menu item, nutrition education programs may be indicated to reduce total intake from the different sources of fats.

Dietary Cholesterol: Intakes and Food Sources

Mean dietary cholesterol intakes were 703 \pm 208 mg for males and 418 \pm 219 for females (Table 33). Mean dietary cholesterol intakes of individual males

varied from a minimum of 335 mg to a maximum of 950 mg. For individual females, the minimum dietary cholesterol intake during the seven days was 193 mg and a maximum of 735 mg. Male cholesterol intakes were similar to previous studies (6,51,52). Since this was the first USARIEM study to report information on females, it is interesting to note that the intake for females was significantly lower ($p < 0.05$) than for males and much closer to the 300 mg/day recommended by the AHA (48).

Intakes of dietary cholesterol were greater at breakfast for both males and females (Table 65). Males consumed 54% and females 43% of their daily cholesterol intakes at breakfast which was similar to the distribution of dietary cholesterol intake patterns that had been reported previously (6,51,52).

Table 65. Distribution of Dietary Cholesterol Intakes at Breakfast, Lunch, and Dinner.

GENDER	% DIETARY CHOLESTEROL INTAKE		
	BREAKFAST	LUNCH	DINNER
Male	54% ^a	23%	23%
Female	43%	29%	29%

^aPercentages have been rounded to the nearest whole number and therefore may not add up to 100%.

Sources of dietary cholesterol are limited to animal products. Contributions to dietary cholesterol intakes by the major food groups are presented in Figure 12. The meat/entree food group accounted for almost 80%

PERCENT CONTRIBUTIONS OF FOOD GROUPS TO MEAN CHOLESTEROL INTAKES

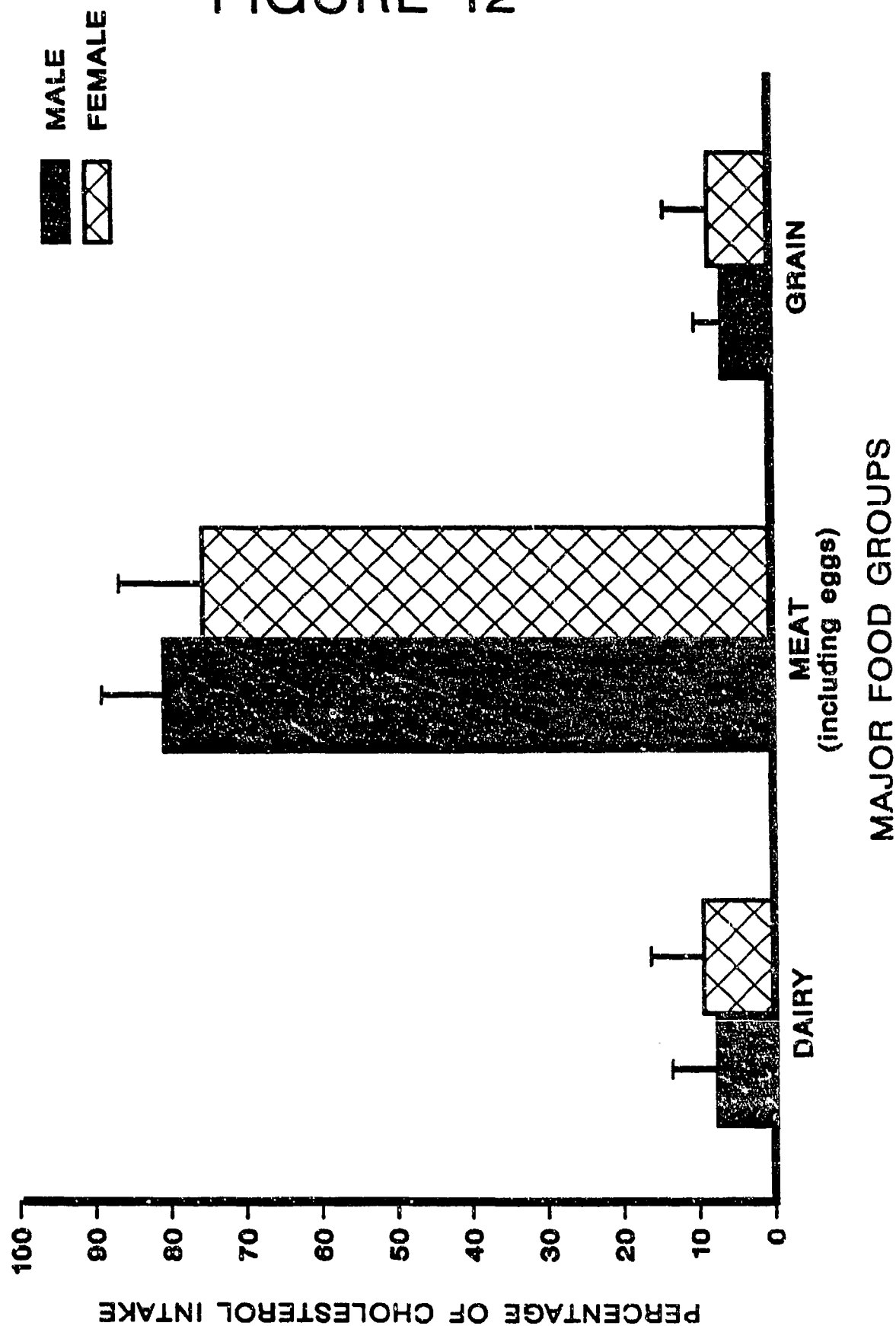


FIGURE 12

of the dietary cholesterol with the contributions by the grain and dairy groups about equal. In the meat/entree group, eggs or menu items in which eggs are used as ingredients usually are directly related to high dietary cholesterol intakes. In the present study, visible egg consumption was directly responsible for 52% of the male dietary cholesterol intake and 39% of the female intake. Significant differences in male and female dietary cholesterol intakes (Tables 33 and 38) were attributable to significant differences in egg consumption, with females tending to eat less eggs (Tables 52 and 53).

Use of a low cholesterol egg substitute has been suggested and tested as a method to passively reduce dietary cholesterol intakes (75). However, the feasibility of using these products remains questionable. Production difficulties were encountered while using the product to prepare scrambled eggs and omelets during the Fort Devens II study (75). When these products were prepared using 100% egg substitute, cooks could not maintain the normal speed of service. The characteristics of this product resulted in scrambled eggs which stuck to the grill and omelets that broke apart while they were being transferred to plates. When the study protocol was changed to test a mixture of one whole egg plus 2 oz egg substitute, the difficulties disappeared. While this mixture appeared acceptable and lowered cholesterol intakes significantly ($p < 0.01$) at the breakfast meal on the days when the product was served, overall cholesterol intakes during the entire study (Devens II) were as high as those of previous dining facility studies (6,51,52,75). A comparison of the cholesterol intakes on days that regular eggs were eaten to days when the egg substitute mixture was consumed indicated

a decrease in cholesterol intake, but the significance was not statistically tested.

Mixing whole eggs with an equal part of egg substitute significantly lowers ($p < 0.01$) cholesterol at the breakfast meal (75), but may not be feasible or very accurate in busy dining facilities. The formulation of an acceptable zero cholesterol product may require the addition of fats or oils. This would lessen the overall value of reducing cholesterol intakes, since total fat intakes would be increased. However, the type of added fat could favorably reduce saturated fat intake.

The use of low cholesterol egg substitutes may still be a viable means of passively lowering dietary cholesterol intakes, however, other options should be considered. Overall, eggs and other high fat meats provided substantial contributions to both male and female dietary cholesterol and total dietary fat intakes. Generally, these items were served and consumed at the breakfast meal. Their impact on cholesterol and total fat intakes were a direct result of their daily availability, popularity, and inherent fat content. The breakfast meal, unlike the lunch and dinner meals, offered very little variety. While much attention has been given to the frequency with which high fat meats are served at lunch or dinner, the breakfast meal has remained essentially unchanged since the implementation of the 1985 nutrition initiatives. Additionally, procedures at the lunch and dinner meals allow customers to select only one entree, whereas at breakfast, soldiers may essentially select all menu items.

Military diners face the choice of either (a) selecting eggs, pancakes, waffles, french toast, and/or high fat breakfast meats or (b) limiting their

choices to hot cereals, dry ready-to-eat cereals, cottage cheese, and/or fruit. Pancakes, waffles, and french toast are most frequently consumed with eggs and/or other breakfast meats, not as a replacement for these items. As a result, the cumulative contributions of these items account for a large percentage of the cholesterol and total dietary fat intakes.

The results of this study suggest that the Army standard a la carte breakfast is causing an increased consumption of visible eggs for almost all males and for many female soldiers. In comparison to the number of eggs eaten prior to basic training (Table 25), most of the males had increased their consumption of eggs (Table 53). Female soldiers were less likely to increase visible egg consumption, however, those females at the higher cholesterol and %FAT intakes were consuming breakfast meals similar to those of the males. Female soldiers, in general, may be content with limiting breakfast intakes to dry cereals, fruits, etc. However, males may need more acceptable alternatives to induce them to reduce their intake of eggs.

The breakfast bar concept provides a limited solution to the problem of providing acceptable alternatives to eggs and high fat breakfast meats. However, soldiers (males in particular) may never accept low fat yogurt, cottage cheese, cooked cereals, or ready-to-eat cereals as acceptable alternatives to the standard breakfast of eggs, bacon, etc. The present study reinforced the findings of previous USARIEM studies (6,51,52) that yogurt and cottage cheese are not popular.

The development of new breakfast entrees, which would be able to successfully compete with the standard breakfast, may help to lower both cholesterol and fat intakes. Use of other low cholesterol, lower fat meat

products such as those made from poultry (i.e., turkey ham, etc.) also may be indicated. Unfortunately, soldiers' meal habits and food preferences at breakfast may be the hardest to change. However, for those soldiers who consistently eat three meals a day in an Army dining facility, this approach may provide the greatest results.

While eggs are seemingly a poor food choice when considering cholesterol intakes, total elimination would reduce the dietary intakes of many other vitamins and minerals. Nutrition education programs need to stress moderation in egg consumption. Soldiers must be offered other breakfast choices which are equally acceptable. The current options offered in Army dining facilities do not appear to be acceptable.

Dietary Sodium: Intakes and Food Sources

Mean sodium intakes were at levels above the upper MRDA limit of 1700 mg/1000 kcal (47). Average male sodium intakes were 1856 mg/1000 kcal and female intakes 1819 mg/1000 kcal (Table 38). These intakes were higher than the levels in previous dining facility studies (6,51,52). However, most of the basic trainees were exercising strenuously, in a very hot environment, for long periods of time, for the first time in their life, suggesting that sodium requirements may have been higher (46). Under these conditions the high sodium intakes may not be out of line with those of previous USARIEM studies where most of the soldiers were less active and temperature conditions less extreme (58). However, weather conditions at Fort Jackson change with the seasons, while levels of sodium intakes may not, since the menu remains the same.

Menu items from the meat/entree group and the grain group were the major sources of sodium for males (66%) and females (64%) (Table 66 and Figure 13). Other major contributors to sodium intake were the vegetable (males 8%, females 10%) and table fat groups (male 8%, females 10%).

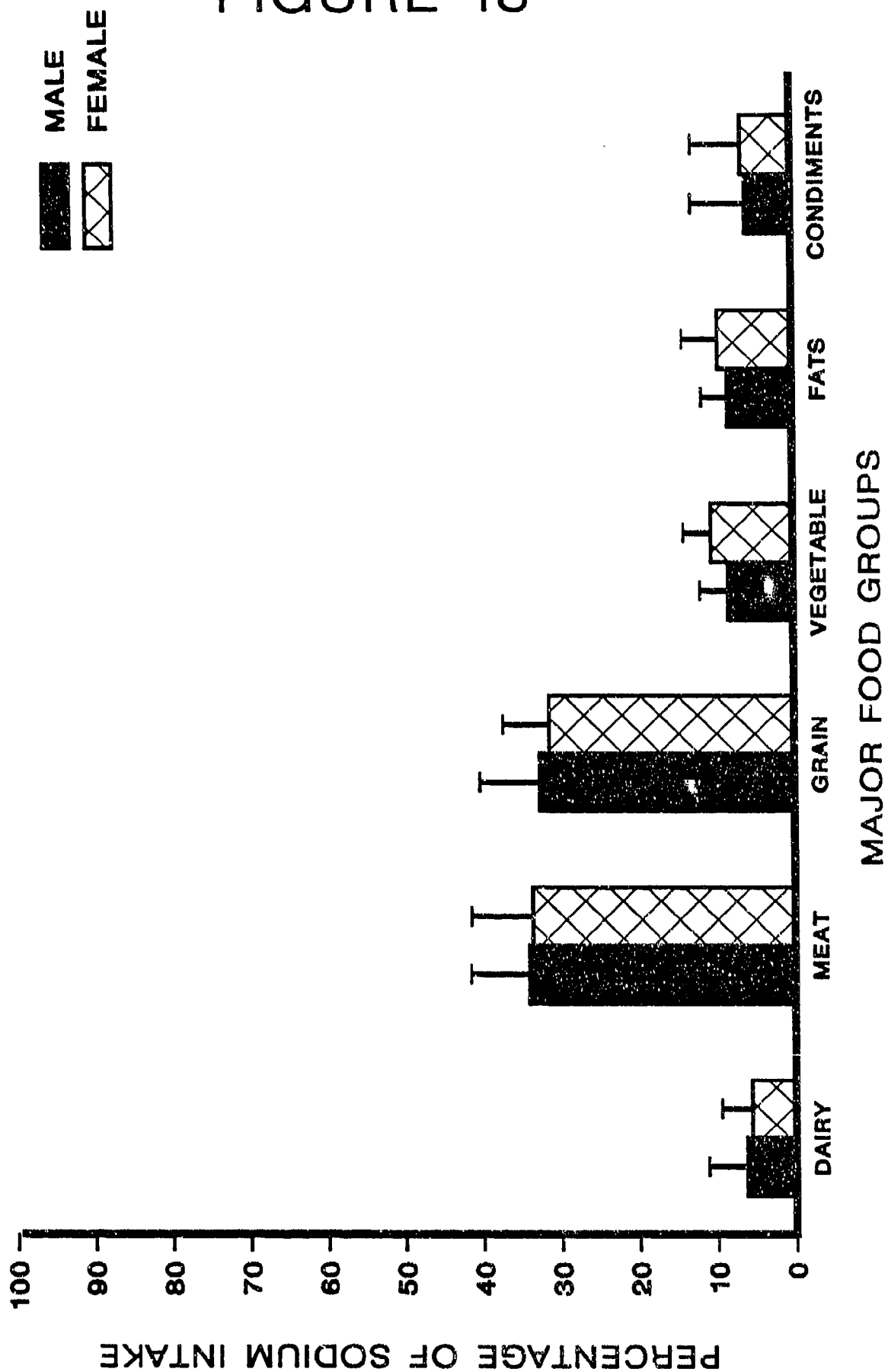
Table 66. Percent Contributions of Major Food Groups to TOTAL SODIUM Intake.

MAJOR FOOD GROUP	MALE	FEMALE
Dairy	6%	5%
Meat/Entrees	33%	33%
Grain	33%	31%
Peanut Butter	1%	1%
Vegetables	8%	10%
Fruit	<1%	<1%
Desserts	1%	2%
Beverages	<1%	<1%
Table Fats	8%	10%
Condiments	5%	5%
Crackers	1%	1%
MRE	3%	0%

Condiments (including table salt) provided 5% of the sodium intakes for both males and females. Salt added to the food by the soldier at the table (table salt) accounted for 4% of the total sodium intake. This level of table salt use was approximately half that reported in previous studies (6,51,52). Soldiers in other studies had 10% of their total sodium intakes attributed to salt added at the table. The lower contribution of table salt to the total sodium intake in the present study may, in part, be a result of the way in

FIGURE 13

PERCENT CONTRIBUTIONS OF FOOD GROUPS TO MEAN SODIUM INTAKES



which the salt was provided. Salt was not placed on the dining tables but rather, trainees had to request that they be given individual salt packets. While this method of dispensing salt may have had some influence upon its use, menu differences may have been an additional influence. Specifically, french fries were not served on a daily basis at Fort Jackson as had been observed in other dining facility studies (6,51,52). When french fries were served during the present study, a third of the basic trainees added salt to the product. While this statistic may not appear especially high, it was the highest incidence of table salt being added to any menu item at one meal. Similar data from other USARIEM studies has not been fully analyzed or reported on, and thus, comparisons are limited.

Overall, table salt was used by a limited number of individuals on a limited number of foods. Table salt was not used at any time by 55% of the male and female subjects. No subject used salt at every meal. One male used salt at 13 of the 21 meals and one female used salt at 15 of the meals. The remaining subjects, who added salt, did so with less frequency, with the majority adding salt at fewer than 7 meals.

Only about 6% of the potential foods were salted. This figure was based on the assumption that at each meal an average of three food items were selected which were likely to be salted (i.e., meat, potatoes, vegetables, etc.). For 21 meals and 81 subjects, the number of potential foods which could be salted would equal 5103. A total of 309 different foods were salted during the study. Of the potential foods that could be salted, meats were the most frequently salted (84 times), followed by potatoes (57 times), eggs and cooked vegetables (38 times each), salad bar items (32 times), rice (30

times), noodles (12 times), grits (9 times), and other miscellaneous items (9 times).

None of the herb seasonings were used by these subjects. However, since the seasonings were always available on the tables, their use may have been under-reported. Based upon the low frequency with which herbal seasonings were used by subjects in other dining facilities, minimal use in the present study was assumed. Herbal seasonings may be more effective in improving the taste of food if used during cooking.

Although the level of table salt use was lower at Fort Jackson, mean sodium intakes per 1000 kcal were higher than at any of the previous USARIEM studies (6,51,52). Overall, approximately 55% of the total sodium intakes were from commercially processed or naturally high sodium foods (e.g., bacon, sausage, canned vegetables, bread, dairy products, corned beef, etc.) which were served without any additional preparation except possibly heating. Since high sodium meat items were major contributors to sodium intakes and because of their popularity, the feasibility of replacing these items with reduced sodium products should be considered.

The contribution of salt or other high sodium commercial ingredients to the sodium content of the remaining menu items cannot be estimated because of limitations in the current recipe analysis methods. However, these high sodium ingredients had an impact on the sodium content of recipes. The use of salt in rice recipes is a good example of this problem. If long grain is prepared without any salt or margarine, the sodium content of the cooked product per 100 g is negligible (76). However, during the present study, the mean sodium content was 508 mg per 100 g cooked rice (Appendix N, Table N-2).

The median serving size varied between 115 and 149 g. Therefore, cooked rice contributed heavily to total sodium intake (12%). The purpose of this example is not to advocate the elimination of salt from cooked rice, but to suggest that using other seasonings in place of all or part of the salt may help to lessen sodium intake.

Vegetables made substantial contributions to sodium intakes at Fort Jackson (Table 66). Contributions to sodium intakes by vegetables (excluding potatoes) were high, not because of added salt, but because of the use of canned or high sodium frozen vegetables. Only three vegetables served during the study had salt added during preparation. Canned vegetables (unless packed as low sodium) contain much higher levels of sodium than do fresh or frozen vegetables. For instance, canned wax beans contain 251 mg sodium per 100 g portion, frozen beans contain 13 mg/100 g portion, and fresh beans have 6 mg/100 g portion (66). The use of canned vegetables during previous studies is unknown.

Presently, starch and vegetable cookery within the military system is rather unimaginative. The primary emphasis in many dining facilities is on the preparation of the high cost, high acceptance meat entrees. Starch and vegetable accompaniments are often limited to those that can be quickly prepared and served with minimal effort. Seasonings for potatoes, pastas, rice, and vegetables are often limited to margarine or salt.

With the advent of the nutrition initiatives, many dining facilities either cut back on the amount of salt in recipes or leave salt completely out of many recipes. Many of the changes to the Armed Forces Recipe Cards also have decreased the salt content without adding additional seasonings or

flavors to improve product acceptability. New starch and vegetable recipes are needed. These recipes should be specific for the product and not necessarily presented as suggested seasonings to a list of vegetables. Flavor enhancers such as herb mixtures and powdered butter substitutes also should be considered.

SUMMARY AND CONCLUSIONS

The dietary intakes of 41 male and 40 female basic trainees were collected and analyzed for seven days during August 1988. This information, obtained during the second and third week of basic training, was used to determine the overall nutritional adequacy of diets; the number of soldiers consuming excessive amounts of fat, cholesterol, and sodium; and the major foods contributing to excessive intakes. These nutrients were targeted because of their association with the development of coronary heart disease. Additional information was collected from a larger sample of soldiers (128 males, 130 females) which included the 81 soldiers from which dietary intakes were collected. The additional data were collected to support the Army Health Risk Appraisal Program and to provide Army planners information needed to make decisions concerning future nutrition education programs, and other nutrition initiatives. The information included: blood lipid levels; food consumption habits prior to basic training; and the levels of nutrition knowledge, attitudes, and awareness possessed by soldiers who were just starting their Army careers.

These basic trainees, on the average, were consuming diets which met or exceeded the Military Recommended Dietary Allowances (MRDA) for energy, protein, vitamins, and minerals. However, on an individual basis many females were not meeting the MRDA for calcium (47%), Vitamin B₁₂ (30%) and iron (50%). Many of these inadequate intakes (i.e., nutrient intakes below the MRDA) were the result of low consumption of dairy products, eggs, and other animal products. These inadequate intakes were especially noted for females

consuming fat intakes between 25-29% of calories as fat (%FAT) in comparison to those at the higher levels of %FAT (30-34%FAT, 35-39%FAT, and >40%FAT).

A direct association between serum total cholesterol levels and current dietary intakes of total fat and cholesterol could not be determined from this study because the majority of these subjects were at an age where blood cholesterol levels were low due to age-induced changes not lifestyle changes. Both male and female mean serum total cholesterol levels (males 140 ± 25 mg/dl, females 163 ± 28 mg/dl, Mean \pm SD) were well within the "desirable" blood total cholesterol classification as established by the Adult Treatment Panel of the National Cholesterol Education Program. However, subjects with serum total cholesterol levels >180 mg/dl, also were consuming diets with fat intakes $>35\%$ FAT and/or consuming higher levels of dietary cholesterol.

Both the male and female mean total dietary fat for the entire seven days was 34%FAT. This was the first sample of soldiers to achieve the Army's goal of total fat intakes not exceeding 35%FAT. The absence of a short order line and limitations on the availability of other high fat, high calorie bakery items (donuts, pie crust, etc.) may have assisted in the attainment of this goal. Although the study mean met the MRDA guidelines for total fat intake, 39% and 47% of the males and females, respectively, did not meet this goal. Differences in the foods eaten by individuals with fat intakes $<35\%$ FAT and those $>35\%$ FAT suggested that higher levels of total fat consumption were the result of over-consumption of menu items to which subjects had free access and could adjust intakes as desired. These menu items were dairy products, peanut butter, margarine, and salad dressings.

Without the service of 2% milk, fat intake would have been higher. Although drinking 2% milk lowered the total fat intake, there were individuals who were drinking excessive amounts of 2% milk and consuming cheese in excess of calcium requirements who had high %FAT intakes. Other nutrition initiatives (service of yogurt, skim milk, cottage cheese) had minimal effects on total fat consumption, since these products were apparently unpopular food choices and seldom consumed.

Consumption of fat from meats, grains, and vegetables remained relatively constant at the different levels of male and female %FAT intakes. Menu items from the meat group contributed 45% of both the male and female total fat intakes for seven days. Menu items contributing the greatest percentage to total fat intakes from the meat group were eggs, bacon, sausage products, and breaded veal steaks. Females with fat intakes $>35\%$ FAT also were eating more of these meat items, while females at fat intakes $<35\%$ FAT were eating fish, poultry, and casserole-type dishes.

A significant difference ($p < 0.05$) was determined between the cholesterol intakes of males and females per 1000 kcal of energy intake (male 225 ± 68 mg/1000 kcal, female 170 ± 83 mg/1000 kcal, Mean \pm SD). Mean cholesterol intakes for males were 703 ± 208 mg/day and 418 ± 219 mg/day for females. This significant difference in cholesterol intake was directly attributable to lower egg consumption and lower consumption of other meats by females in general. The daily service of eggs apparently influenced the consumption patterns of males, since more visible eggs were eaten during this seven day period than these subjects reported eating prior to basic training. Females appeared to be less influenced by the availability of eggs.

Mean sodium intakes were at levels above the upper MRDA limit of 1700 mg/1000 kcal (males 1856 mg/1000 kcal, females 1819 mg/1000 kcal). These sodium intakes were generally higher than those reported for other USARIEM studies. Sodium intakes from table salt and other condiments were not a contributing factor since use of these items were minimal. Table salt accounted for only 4% of the total male and female sodium intakes in the present study as opposed to 10% in previous USARIEM studies. Increased availability and consumption of commercially processed foods and the almost exclusive use of canned or high sodium frozen vegetables at Fort Jackson may have also contributed to the higher sodium intakes. Menu items from the meat/entree group (33%) and the grain group (32%) were the major sources of sodium. Vegetables (9%) and table fats (9%) were also significant sources.

These data suggest that nutrition initiatives which have focused on the frequency with which high fat, high sodium menu items are served or those aimed at reducing the fat and sodium content of existing recipes may have achieved their maximum results. Continued efforts along these lines without the introduction of new menu items, recipes, or ingredients to the Army feeding system may meet with minimal success. This conclusion is supported, in part, by the fact that the greatest percentage of fat, cholesterol, and sodium intakes were the result of soldiers eating menu items over which the dining facility had little control in terms of product formulation. Another fact supporting this conclusion was the fact that over 50% of the males and females participating in this study consumed diets with <35%FAT. Soldiers with fat intakes >35%FAT were consuming excessive quantities of dairy products, peanut butter, margarine, and salad dressings.

Nutrition education programs which stress the contributions of foods (dairy products, eggs, etc.) to nutritional well being as well as the importance of moderation in consumption may help some soldiers to lower fat and cholesterol intakes without increasing their risk of inadequate intakes of other essential nutrients. These programs may achieve the greatest success with soldiers who have limited nutrition knowledge, but are aware of and agree strongly that proper nutrition will result in overall better health.

However, a vast majority of soldiers select foods for reasons other than nutritional value, and will continue to do so regardless of nutrition knowledge, and therefore more than nutrition education is needed. The nutrition initiatives need to concentrate on providing lower calorie, nutritious menu alternatives for soldiers eating in garrison dining facilities. Present nutrition initiatives are primarily programs which reduce or eliminate foods without providing adequate alternatives. With the exception of 2% milk, the low fat, low sodium alternatives which have been added to dining facility menus are meeting with limited success. The average soldier apparently does not accept low fat yogurt, low fat cottage cheese, or herb mixtures as popular menu items and only infrequently, if ever, will eat them if they are offered as alternatives to popular foods. A possible alternative is to use the low fat yogurts, low fat cottage cheeses, and herb mixtures to replace the high fat, high sodium ingredients in present recipes to produce acceptable and palatable desserts and entrees. Spices other than salt and margarine can be added to low sodium frozen vegetables and to rice. The high sodium, high fat commercial items such as ham, bacon, and sausage do not need to be removed from the menu entirely but acceptable reduced

sodium/fat items need to be procured and/or recipes need to be developed that use these items with other grains or vegetables to produce new and exciting entrees. As more soldiers are identified with high blood cholesterol levels, the demand for acceptable alternatives will increase. If acceptable alternatives are not provided, compliance with dietary restrictions may not be possible and soldiers will tend to return to past eating habits. The answer to the problem is very complex and to a large extent falls outside the boundaries of this report. However, the objectives of future nutrition initiatives should not be to reduce fat, cholesterol, and sodium intake by taking away foods, but rather, to develop highly acceptable and palatable alternatives which also have the added benefit of being low fat, low in cholesterol, and lower in sodium.

RECOMMENDATIONS

1. Develop and/or improve the quality of low fat, low cholesterol, low sodium recipes. Suggestions are to incorporate low fat yogurt and cottage cheese in place of high fat ingredients in present dessert and entree recipes; develop new breakfast entrees to replace eggs and other high fat breakfast meats; develop reduced fat and sodium gravies/sauces to replace current high fat and high sodium gravies; and use herb mixtures and flavor enhancers to improve the acceptability of vegetables, rice, and other starches.
2. Provide well-rounded nutrition education programs that stress the problems of excessive consumption of "good" foods and of inadequate intakes of calcium and other essential nutrients that can occur in attempting to attain a low fat, low cholesterol, low sodium diet.
3. Replace high fat, high cholesterol, and high sodium foods with similar acceptable food items that are lower in fat, cholesterol, and/or sodium instead of eliminating them totally. For instance, replace the high sodium ham with reduced sodium hams and stress the use of frozen low sodium vegetables in place of canned or high sodium frozen vegetables.
4. Reanalyze previous USARIEM data for the effects of the short order line and food group contributions on total fat, cholesterol, and sodium intake.

BIBLIOGRAPHY

1. Army Regulation 600-32, Army Health Promotion Regulation. Headquarters, Department of the Army, 1986.
2. Department of the Army Pamphlet 600-32-2, The Army Health Promotion Program, Fit to Win, Commander's Guide. Headquarters Department of the Army, September, 1987.
3. U.S. Army Ch 3, TM 10-412 (U.S. Navy NAVSUP Publication, Ch 3; U.S. Air Force Ch 3 AFM 146-12; U.S. Marine Corps NAVMC 2778 Ch 1), Armed Forces Recipe Service. Departments of the Army, Navy, and the Air Force, Washington, D.C., 1988.
4. Department of the Army Supply Bulletin SB 10-260, Master Menu For Jun-Sep 1988, Department of the Army, Washington, D.C., 1988.
5. Army Regulation 30-1, The Army Food Service Program. Headquarters Department of the Army, 1988.
6. Carlson, D.E., Dugan, T.B., Buchbinder, J.C., Allegretto, J.D., and Schnakenberg, D.D.: Nutritional Assessment of the Ft. Riley Non Commissioned Officer Academy Dining Facility. U.S. Army Research Institute of Environmental Medicine Report No. T14-87, 1987.
7. Rose, R.W., Morgan, T.E., Rose, M.S., Srinivasan, S.R., Berenson, G.S., Askew, E.W.: Population screening for blood lipid levels and related coronary heart disease risk factors among U.S. Army basic trainees. U.S. Army Research Institute of Environmental Medicine Report No. T2-89, 1988.
8. National Research Council: Designing Foods. Washington, D.C.: National Academy Press, 1988.
9. Caliendo, M.A.: Nutrition and Preventative Health Care. New York, N.Y.: Macmillan Publishing Co., Inc., 1981.
10. Enos, W.F., Holmes, R.H., Beyer, J.: Coronary disease among United States soldiers killed in action in Korea, preliminary report. JAMA 152:1090, 1953.
11. Castelli, W.P., Garrison, R.J., Wilson, P.W.F., Abbott, R.D., Kalousdian, S., Kannel, W.B.: Incidence of coronary heart disease and lipoprotein cholesterol levels, the Framingham Study. JAMA 256:2835, 1986.
12. Lipid Research Clinics Program: The Lipid Research Clinics Coronary Primary Prevention Trial results: I. Reduction in incidence of coronary heart disease. JAMA 251:361, 1984.

13. Stamler, J., Wentworth, D., Neaton, J.D.: Is relationship between serum cholesterol and risk of premature death from coronary heart disease continuous and graded? Findings in 356,222 primary screenees of the Multiple Risk Factor Intervention Trial (MRFIT). JAMA 256:2823,1986.
14. Henry, J.B.: Clinical Diagnosis and Management by Laboratory Methods. Philadelphia: W.B. Saunders Company, 1984.
15. Grundy, S.M.: Cholesterol and coronary heart disease. JAMA 256:2849,1986.
16. Krause, M.V., Mahan, L.K.: Food, Nutrition, and Diet Therapy. Philadelphia: W.B. Saunders Company, 1984.
17. Connor, W.E., Lin, D.S.: The intestinal absorption of dietary cholesterol by hypercholesterolemic (Type II) and normocholesterolemic humans. J Clin Invest. 53:1062,1974.
18. Tyroler, H.A.: Cholesterol and cardiovascular disease: An overview of Lipid Research Clinics (LRC) epidemiologic studies as background for the LRC coronary primary prevention trial. Am J Cardiol 54:14c,1984.
19. Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. National Cholesterol Education Program, Coordinated by the National Heart Lung and Blood Institute, National Institutes of Health, Public Health Service, U.S. Department of Health and Human Services, NIH Publication No 88-2925, Jan 1988.
20. Castelli, W.P., Abbot, R.D., McNamara, P.M.: Summary estimates of cholesterol used to predict coronary heart disease. Circulation 67:730,1983.
21. Rifkind, B.M., Lenfant, C.: Cholesterol lowering and the reduction of coronary heart disease risk. JAMA 256:2872,1986.
22. Brown, M.S., Goldstein, J.L.: A receptor-mediated pathway for cholesterol homeostasis. Science 232:34,1986.
23. Grundy, S.M., Vega, G.L.: Influence of mevinolin on metabolism of low density lipoproteins in primary moderate hypercholesterolemia. J Lipid Res 26:1464,1985.
24. Goldstein, J.L., Schrott, H.G., Hazzard, W.R., Bierman, E.L., and Motulsky, A.G.: Hyperlipidemia in coronary heart disease: II. Genetic analysis of lipid levels in 176 families and delineation of a new inherited disorder, combined hyperlipidemia. J Clin Invest 52:1544,1973.
25. Teng, B., Sniderman, A.D., Soutar, A.K., and Thompson, G.R.: Metabolic basis of hyperapobetalipoproteinemia: Turnover of apolipoprotein B in low density lipoprotein and its precursors and subfractions compared with normal and familial hypercholesterolemia. J Clin Invest 77:663,1986.

26. US-USSR Steering Committee for Problem Area 1. The pathogenesis of atherosclerosis: Collaborative US-USSR study on the prevalence of dyslipoproteinemias and ischemic heart disease in American and Soviet populations. *Am J Cardiol* 40:260,1977.
27. Keys, A.: Coronary heart disease in seven countries. *Circulation* 41: Suppl, 1970.
28. Keys, A., Anderson, J.T., Grande, G.: Serum cholesterol response to changes in the diet: II The effect of cholesterol in the diet. *Metabolism* 14:759,1965.
29. Hegsted, D.M., McGandy, R.B., Myers, M.L., Stare, F.J.: Quantitative effects of dietary fat on serum cholesterol in man. *Am J Clin Nutr* 17:281,1965.
30. Mattson, F.H., Grundy, S.M.: Comparison of effects of dietary saturated, monounsaturated, and polyunsaturated fatty acids on plasma lipids and lipoproteins in man. *J Lipid Res* 26:194,1985.
31. Grundy, S.M., Nix, D., Whelan, M.F., Franklin, Z.: Comparison of three cholesterol-lowering diets in normolipidemic men. *JAMA* 256:2351,1986.
32. Phillipson, B.E., Rothrock, D.W., Connor, W.E., Harris, W.S., Illingworth, D.R.: Reduction of plasma lipids, lipoproteins, and apoproteins by dietary fish oils in patients with hypertriglyceridemia. *N Engl J Med* 312:1210,1985.
33. McNamara, D.J., Kolb, R., Parker, T.S., Batwin, H., Samuel, P., Brown, C.D., Ahrens, Jr., E.H.: Heterogeneity of cholesterol homeostasis in man. Responses to changes in dietary fat quality and cholesterol quantity. *J Clin Invest* 79:1729,1987.
34. Zanni, E.E., Zannis, V.I., Blum, C.B., Herbert, P.N., and Breslow, J.L.: Effect of egg cholesterol and dietary fats on plasma lipids, lipoproteins, and apoproteins of normal women consuming natural diets. *J Lipid Res* 28:518,1987.
35. Kris-Etherton, P.M., Krummel, D., Russell, M.E., Dreon, D., Mackey, S., Borchers, J., and Wood, P.D.: The effect of diet on plasma lipids, lipoproteins, and coronary heart disease. *J. Amer Diet Assoc* 88:1373, 1988.
36. Van Horn, L.V., Liu, K., Parker, D., Emidy, L., Liao, Y., Pan, W.H., Giumetti, D., Hewitt, J., and Stamler, J.: Serum lipid response to oat product intake with a fat-modified diet. *J Am Diet Assoc* 86:759,1986.
37. Anderson, J., Chen, W.: Plant fiber: Carbohydrate and lipid metabolism. *Am J Clin Nutr* 32:346,1979.

38. Burkitt, D., Walker, A., Painter, N.: Dietary fiber and disease. JAMA 229:1068,1974.
39. Judd, P., Truswell, A.S.: The effect of rolled oats on blood lipids and fecal steroid excretion in man. Am J Clin Nutr 34:2061,1981.
40. Kelsay, J.L.: A review of research effects of fiber intake on man. Am J Clin Nutr 31:142,1978.
41. Tanza, E., Butrum, R.R.: A critical review of food fiber analysis and data. J Am Diet Assoc 86:732,1986.
42. Merz, E.: Low-fat diet may be imprudent for some, say opponents of population-based cholesterol control. JAMA 256:2779,1986.
43. Farquhar, J.W., Frank, A., Gross, R.C., Reaven, G.M.: Glucose, insulin, and triglyceride responses to high and low carbohydrate diets in man. J Clin Invest 45:1648,1966.
44. Carroll, K.K., Gammel, E.B., Plunkett, E.R.: Dietary fat and mammary cancer. Can Med Assoc J 98:590,1968.
45. Meade, C.J., Merten, J.: The mechanism of immunoinhibition by arachidonic and linoleic acid. Allergy Appl Immunol 51:2,1976.
46. Food and Nutrition Board: Recommended Dietary Allowances. 9th rev.ed., 1980. Washington, D.C.: National Academy of Sciences, 1980.
47. Army Regulation 40-25 (Naval Command Medical Instruction 10110.1, Air Force Regulation 160-95): Nutrition Allowances, Standards, and Education: Headquarters, Department of the Army, the Navy, and the Air Force, 1985.
48. Dietary Guidelines for Healthy American Adults. Publication No. 21-0030. Dallas: American Heart Association, 1986.
49. Nutrition Monitoring in the United States: A Progress Report from the Joint Nutrition Monitoring Evaluation Committee. U.S. Department of Health and Human Services and U.S. Department of Agriculture, DHHS Publication N6(PHE) 86-1255,1986.
50. Nationwide Food Consumption Survey - Continuing Survey of Food Intakes by Individuals: Men 19-50 Years, 1 Day, 1985. U.S. Department of Agriculture, NFC, CSF11 Report No. 85.3, 1986.
51. Szeto, E.G., Carlson, D.E., Dugan, T.B., Buchbinder, J.C.: A comparison of nutrient intakes between a Ft. Riley contractor-operated and a Ft. Lewis military-operated garrison dining facility. U.S. Army Research Institute of Environmental Medicine Report No. T2-88, 1987.

52. Szeto, E.G., Dugan, T.B., Gallo, J.A.: Passive nutrition intervention in a military-operated garrison dining facility Ft. Devens I. U.S. Army Research Institute of Environmental Medicine Report No. T3-88, 1988.
53. Cullen, R.W., Paulbitski, A., Oace, S.M.: Sodium, hypertension, and the U.S. dietary goals. *J Nutr Educ* 10:59, 1978.
54. U.S. Department of Health, Education, and Welfare: National High Blood Pressure Education Program. Fact Sheet. Publ. No. (NIH) 76-632. Washington D.C.: Government Printing Office, 1976.
55. Prior, I.A.M., Evans, J.G., Harvey, H.P.B., Davidson, F., Lindsey, M.: Sodium intake and blood pressure in two Polynesian populations. *N Engl J Med* 279:515, 1968.
56. Dahl, L.K.: Salt and hypertension. *Am J Clin Nutr* 25:231, 1972.
57. Costill, D.L.: Sweating: Its composition and effects on body fluids. In. Milvy P., ed. *The Marathon: Physiological, medical, epidemiological, and psychological studies*. New York: New York Academy of Sciences, 1977.
58. HDQT, Depts of the Army, Navy and Air Force: TB MED 507 Occupational and environmental health: Prevention, treatment and control of heat injury. July 1980.
59. Wardlaw, G.: The effects of diet and life-style on bone mass in women. *J Am Diet Assoc* 88:17, 1988.
60. Finch, C.A., Cook, J.D.: Iron deficiency. *Am J Clin Nutr* 39:471, 1984.
61. Edwards, J.S.A., Rose, M.S., Rose, R.W. Comparison of Self Reported to Observed Dietary Intake. U.S. Army Research Institute of Environmental Medicine Report (In preparation).
62. SPSS Inc.: SPSS-X User's Guide, New York: McGraw-Hill Book Co., 1983.
63. Department of the Army Pamphlet 600-63, The Army Health Promotion Program, Fit to Win, Health Risk Appraisal, Headquarters Department of the Army, 1987.
64. Connor, S.L., Connor, W.E.: *The New American Diet*. New York: Simon and Schuster, Inc., 1986.
65. Quigley, B., Engell, D., Hirsch, E.: Soldier and food service personnel attitudes toward nutrition initiatives. U.S Army Research, Development, and Engineering Center, Technical Report No. Natick/TR-88/02, 1987.
66. Data Base for Standard Reference, Release 6 tape. Washington, DC: U.S. Department of Agriculture, 1987.

67. Matthews, R.H., Garrison, Y.J.: Food yields summarized by different stages of preparation. Agriculture Handbook No. 102. Washington, DC: U.S. Department of Agriculture, 1975.
68. Federal Supply Catalog: Consolidated Stock List FSC Group 89 Subsistence. Publication No. C8900 - SL, 1 April 1988.
69. Shugart, G.S., Molt, M., Wilson, M.: Food for 50, Seventh Edition. New York: Wiley Co, 1985.
70. Combat Field Feeding System-Force Development Test and Experimentation (CFFS-FDTE) Test Report. U.S. Army Research Institute of Environmental Medicine and U.S. Army Combat Developments Experimentation Center. CDEC-TR-85-006A, 1986.
71. Rose, M.S., Buchbinder, J.C., Dugan, T.B., Szeto, E.G., Allegretto, J.D., Rose, R.W., Carlson, D.E., Samonds, K.W., Schnakenberg, D.D.: Determination of nutrient intakes by a modified visual estimation method and computerized nutritional analysis for dietary assessment. U.S. Army Research Institute of Environmental Medicine Report No. T6-88, 1987.
72. Reports of Health Risk Appraisal Results for Jan-Sep 88: United States Army Health Care Systems Support Activity, Fort Sam Houston, TX, 1988.
73. Wyant, K.W., and Meiselman, H.L.: Sex and race differences in food preferences of military personnel. J. Am Diet Assoc 84:167, 1984.
74. Tastes of America: Food preferences. Restaurants and Institutions, 97:48, 1987.
75. Szeto, E., Gallo, J., Samonds, K.: Passive nutrition intervention in a military-operated garrison dining facility Ft. Devens II. U.S. Army Research Institute of Environmental Medicine Report (In Preparation).
76. Adams, C.F: Nutritive Value of American foods, Agriculture Handbook No. 456. Washington, D.C.: Department of Agriculture, 1975.

APPENDICES

APPENDIX A - MRDA FOR SELECTED NUTRIENTS

MRDA for selected nutrients *

Nutrient	Unit	Male	Female
Energy ^{2,3}	kcal MJ	3200(2800-3600) 13.4(11.7-15.1)	2400(2000-2800) 10.0(8.4-11.7)
Protein ⁴	gm	100	80
Vitamin A ⁵	mcg RE	1000	800
Vitamin D ^{6,7}	mcg	5-10	5-10
Vitamin E ⁸	mg TE	10	8
Ascorbic Acid	mg	60	60
Thiamin (B ₁)	mg	1.6	1.2
Riboflavin (B ₂)	mg	1.9	1.4
Niacin ⁹	mg NE	21	16
Vitamin B ₆	mg	2.2	2.0
Folacin	mcg	400	400
Vitamin B ₁₂	mcg	3.0	3.0
Calcium ⁷	mg	800-1200	800-1200
Phosphorus ⁷	mg	800-1200	800-1200
Magnesium ⁷	mg	350-400	300
Iron ⁷	mg	10-18	18
Zinc	mg	15	15
Iodine	mcg	150	150
Sodium	mg	See note ¹⁰	See note ¹⁰

* MRDA for moderately active military personnel, ages 17 to 50 years, are based on the *Recommended Dietary Allowances*, ninth revised edition, 1980.

² Energy allowance ranges are estimated to reflect the requirements of 70 percent of the moderately active military population. One megajoule (MJ) equals 239 kcals.

³ Dietary fat calories should not contribute more than 35 percent of total energy intake.

⁴ Protein allowance is based on an estimated protein requirement of 0.8 gm/kilogram (kg) desirable body weight. Using the reference body weight ranges for males of 60 to 79 kilograms and for females of 46 to 63 kilograms, the protein requirement is approximately 48 to 64 grams for males and 37 to 51 grams for females. These amounts have been approximately doubled to reflect the usual protein consumption levels of Americans and to enhance diet acceptability.

⁵ One microgram of retinol equivalent (mcg RE) equals 1 microgram of retinol, or 6 micrograms betacarotene, or 5 International units (IU).

⁶ As cholecalciferol, 10 micrograms of cholecalciferol equals 400 IU of vitamin D.

⁷ High values reflect greater vitamin D, calcium, phosphorus, magnesium, and iron requirements for 17- to 18-year olds than for older ages.

⁸ One milligram of alpha-tocopherol equivalent (mg TE) equals 1 milligram d-alpha-tocopherol.

⁹ One milligram of niacin equivalent (mg NE) equals 1 milligram niacin or 60 milligrams dietary tryptophan.

¹⁰ The safe and adequate levels for daily sodium intake of 1100 to 3300 mg published in the RDA are currently impractical and unattainable within military food service systems. However, an average of 1700 milligrams of sodium per 1000 kilocalories of food served is the target for military food service systems. This level equates to a daily sodium intake of approximately 5500 milligrams for males and 4100 milligrams for females.

Table 2-2
Estimated safe and adequate daily dietary intake ranges of selected vitamins and minerals ¹

Nutrient	Unit	Amount
Vitamins		
Vitamin K	mcg	70-140
Biotin	mcg	100-200
Pantothenic Acid	mg	4-7
Trace Elements ²		
Fluoride	mg	1.5-4.0
Selenium	mcg	50-200
Molybdenum	mg	0.15-0.50
Copper	mg	2-3
Manganese	mg	2.5-5.0
Chromium	mcg	50-200
Electrolytes		
Potassium	mg	1875-5625
Chloride	mg	1700-5100

¹ This table is based on the *Recommended Dietary Allowances*, ninth edition, 1980, table 10, "Estimated Safe and Adequate Daily Dietary Intakes of Selected Vitamins and Minerals." Estimated ranges are provided for these nutrients because sufficient information upon which to set a recommended allowance is not available. Values reflect a range of recommended intake over an extended period of time.

² Since toxic levels for many trace elements may only be several times the usual intakes, the upper levels for the trace elements given in this table should not be habitually exceeded.

Source: Reference 47.

APPENDIX B - COMPARISON OF DIETARY FAT INTAKES
IN MILITARY DINING FACILITIES

TRENDS IN FAT, SODIUM AND CHOLESTEROL INTAKES
IN MILITARY DINING HALLS DURING PAST 35 YEARS (1952-1987)

			Fat (% Fat Cals)	Sodium (mg/1000Kcal)	Cholesterol (mg/1000Kcal)
1952	Ft. Sheridan, IL	All meals	46.0	----	----
1952	Camp Pickett, VA	All meals	46.0	----	----
1953	Ft. Riley, KS	All meals	48.6	----	----
1955	Ft. Carson, CO	All meals	39.8	----	----
1966	Ft. Huachuca, AZ	All meals/males	45.5	992	----
		All meals/females	48.9	775	----
1971	Lowry AFB, CO	All meals	42.5	1562	----
1972	Ft. Myer, VA (Contractor Oper)	Brk	45.0	----	----
		Dinner (reg)	44.3	----	----
		Dinner (s.o.)	42.0	----	----
		Supper (reg)	41.6	----	----
		Supper (s.o.)	40.6	----	----
		All meals	43.1	1316	----
1974	Loring AFB(pre BAS/A	La Carte)			
		Brk	41.0	1176	----
		Dinner (reg)	47.2	980	----
		Dinner (s.o.)	44.2	1216	----
		Supper	43.4	1268	----
1975	Loring AFB(Post BAS/A	La Carte)			
		Brk	47.1	1491	----
		Dinner (reg)	40.6	1372	----
		Dinner (s.o.)	40.2	1258	----
		Supper	43.7	1286	----
1975	<i>NAS/Alameda</i> Pre Cash A La Carte	All DH meals	<i>Calories</i> <u>7761</u> 44.8	1351	----
1976	<i>NAS/Alameda</i> Post Cash A La Carte	All DH meals	<i>1053</i> 43.8	1196	----

			Fat (% Fat Cals)	Sodium (mg/1000Kcal)	Cholesterol (mg/1000Kcal)
1977	29 Palms Marine Corps Base, CA				
	Force Troops DH	Brk	45.5	----	----
		Lunch	43.3	----	----
		Supper	45.9	----	----
	Students DH	Brk	40.8	----	----
		Lunch	43.5	----	----
		Supper	43.8	----	----
1978	29 Palms Marine Corps Base, CA				
	Lodge (A-ration)	Brk	44.4	----	----
		Lunch	39.0	----	----
		Supper	43.1	----	----
	BBQ Short Order	Lunch	45.9	----	----
		Supper	47.1	----	----
	29 Burgers S/O	Lunch	45.5	----	----
		Supper	45.2	----	----
	Steak House	Lunch	38.7	----	----
		Supper	41.8	----	----
	Pasta Palace(Ital)	Brk	41.0	----	----
		Lunch	43.5	----	----
		Supper	41.9	----	----
	Sports Circle	Brk	39.4	----	----
	(A-ration)	Lunch	39.7	----	----
		Supper	40.1	----	----
1977	USS Saratoga				
	(Before Fast Fds)	Brk	43.1	----	633
	(A-ration)	Lunch	42.1	----	176
		Dinner	40.4	----	160
		All meals	42.1	----	271
	Short Order				
		Brk	28.4	----	275
		Lunch	46.1	----	150
		Dinner	46.3	----	150
		All meals	43.9	----	168
1978	USS Saratoga				
	(After Fast Fds)	Brk	43.1	----	495
	(A-ration)	Lunch	50.2	----	203
		Dinner	48.1	----	184
		All meals	47.9	----	258
	Fast Foods				
		Brk	31.5	----	128
		Lunch	47.4	----	150
		Dinner	44.9	----	172
		All meals	44.7	----	160

			Fat (% Fat Cals)	Sodium (mg/1000Kcal)	Cholesterol (mg/1000Kcal)
1976	U.S. Military Academy				
	(Dining Hall	Males	41.8	1125	182
	Intakes)	Females	42.7	1174	211
1986	Ft. Sill OK	All meals	36.6	1694 (2004)*	201
1986	Ft. Riley, KS, NCO Academy				
		All meals	37.6	1612 (1821)*	245
1986	Ft. Lewis, WA	All meals	37.4	1435 (1532)*	236
1977-78	USDA Nat'l Food Consumption Survey				
		Males(19-64 yrs)	42.0	1551	226
1985	USDA Nat'l Continuing Survey				
		Males(19-34 yrs)	35.3	1464	177


*Includes Table Salt added.

DAVID D. SCHNAKENBERG, COL, MS
USARIEM
13 October 1987

APPENDIX C - APPROVALS OF THE HUMAN USE
REVIEW COMMITTEES

DISPOSITION FORM

For use of this form, use AF 240-18; the proponent agency is TAGO.

REFERENCE OR OFFICE SYMBOL	SUBJECT		
SGRD-UEZ (70-1n)	Report of the USARIEM Human Use Review Committee		
TO	FROM	DATE	GMT 1
C, Mil Nutr Div	Commander	7 June 1988 /atw/4811	
<p>1. The USARIEM Human Use Review Committee has reviewed and recommended approval of your protocol entitled "Nutritional Assessment and Cardiac Risk Appraisal of U.S. Army Basic Trainees," HURC #338. The Decisions and Recommendations of the Committee are attached.</p> <p>2. The Committee recommended approval of this study on condition that the points mentioned be appropriately modified or corrected. Following receipt of your response, I will forward your protocol to the Human Use Office at our Headquarters for their final approval.</p>			
<p>Encl</p> <p> DAVID D. SCHNAKENBERG Colonel, MS Commanding</p>			

DA FORM 2496
AUG 80

PREVIOUS EDITIONS WILL BE USED

GPO : 1987 O - 273-628



DEPARTMENT OF THE ARMY
OFFICE OF THE SURGEON GENERAL
8109 LEESSBURG PIKE
FALLS CHURCH, VA 22041-3258



REPLY TO
ATTENTION OF

SGRD-HR

14 July 1988

MEMORANDUM FOR: Commander, U.S. Army Research Institute of
Environmental Medicine, ATTN: SGRD-UE-2, Natick, MA 01760-5007

SUBJECT: Protocol Entitled "Nutritional Assessment and Cardiac
Risk Appraisal of U.S. Army Basic Trainees," HURC #338, Submitted
by LTC Eldon W. Askew, MS, USARIEM (Log No. A-4689)

1. Revisions submitted in response to recommendations of the
Acting Chairman, Human Subjects Research Review Board have been
reviewed and found to satisfactory.
2. This study is approved for implementation.
3. Reference memorandum, SGRD-UE-2, 1 Jul 88, SAB.
4. Should you have any questions concerning this matter, please
contact the Human Use Review and Regulatory Affairs Office at
AUTOVON 343-2165 or (301) 663-2165.

GREGORY P. BEREZUK
LTC, MS

Chief, Human Use Review and
Regulatory Affairs Office

APPENDIX D - ASSIGNMENT OF FORT JACKSON, SC
AS THE TEST SITE

PCV MSG 0 TIME RADAY
27344 1239 834/88

*Nutrition
at: Col*

PRIOR

CCR--MTL--~~ARIE~~--NAVY--DC--TD--XO--ADJ--SGH--IG--CEO--IRACO--OEO--PAO--
PROTO--SNOB--AMEC--ASCO--DPR--PSCAD--RND--DEPH--DODFD--IND--LEHD--F&AO--
FED--FIO--HC--MBCO--IPL--NCLHO--GCC--SAFETY--SATD--TRANS--LE&SO--TCC--OTHER

PTTUZYUW RUEADWD0096 0332319-0000--RUEDNA.

ZNR 00000

P 022130Z FEB 88

FM DA WASHDC //DALO-TST-F//

TO RUEDNA/CDRUSARIEH NATICK MA //SGRD-UE-M//

INFO RUEAIA/CDR TRADOC FT MONROE VA//ATPL-TS//

RUEOAGG/CDRTSA FT LEE VA //DALO-TAF-D//

RUEADWD/MC DA WASHDC //DASG-RDZ//

BT

UNCLAS

SUBJECT: USARIEH EVALUATION OF NUTRITION INITIATIVES IN GARRISON
DINING FACILITIES

A. HQDA (DALO-TST) MSG, 111507Z JAN 88, SAB.

1. REFERENCE A REQUESTED TRADOC AND FORT JACKSON'S ASSISTANCE IN
IDENTIFYING SPECIFIC BASIC TRAINING DINING FACILITIES WHERE USARIEH
COULD CONDUCT AN EVALUATION OF GARRISON DINING NUTRITION
INITIATIVES.

2. PER PHONECON BETWEEN CPT JACKSON, TRADOC FOOD SERVICE AND OFFICE
AND MSG ADOLPHI, HQDA ON SAB, THE FOLLOWING FACILITIES AT FORT
JACKSON HAVE BEEN IDENTIFIED FOR USARIEH'S STUDY:

PRIMARY FACILITY: BUILDING 11000

ALTERNATIVE FACILITY: BUILDING 12000.

PAGE 02 RUEADWD0096 UNCLAS

3. INSTALLATION FOOD SERVICE POINTS OF CONTACT INCLUDE C22 FOPPE
AND SGN HANON, AV 734-5083/4015.

4. HQDA (DALO-TST) POC IS MRS. ADOLPHI, AV 225-1201.

BT

00096

NNNN

APPENDIX E - VOLUNTEER AGREEMENT AND
VOLUNTEER REGISTRY FORMS

VOLUNTEER AGREEMENT AFFIDAVIT

For use of this form, see AR 40-58; the proponent agency is the Office of the Surgeon General

THIS FORM IS AFFECTED BY THE PRIVACY ACT OF 1974

1. AUTHORITY: 10 USC 3012, 44 USC 3101 and 10 USC 1071-1087.

2. PRINCIPAL PURPOSE: To document voluntary participation in the Clinical Investigation and Research Program. SSN and home address will be used for identification and locating purposes.

3. ROUTINE USES: The SSN and home address will be used for identification and locating purposes. Information derived from the study will be used to document the study; implementation of medical programs; teaching; adjudication of claims; and for the mandatory reporting of medical condition as required by law. Information may be furnished to Federal, State and local agencies.

4. MANDATORY OR VOLUNTARY DISCLOSURE: The furnishing of SSN and home address is mandatory and necessary to provide identification and to contact you if future information indicates that your health may be adversely affected. Failure to provide the information may preclude your voluntary participation in this investigational study.

PART A - VOLUNTEER AFFIDAVIT

VOLUNTEER SUBJECTS IN APPROVED DEPARTMENT OF THE ARMY RESEARCH STUDIES

Volunteers under the provisions of AR 70-55 are authorized all necessary medical care for injury or disease which is the proximate result of their participation in such studies.

I, _____ SSN _____ having
(last, first, middle)

full capacity to consent and having attained my _____ birthday, do hereby volunteer to participate in

NUTRITIONAL ASSESSMENT AND CARDIAC RISK APPRAISAL OF U.S. ARMY BASIC TRAINEES
(research study)

under direction of Mr. Robert W. Rose conducted at Fort Jackson, S.C.
(name of institution)

The implications of my voluntary participation; the nature, duration and purpose of the research study; the methods and means by which it is to be conducted; and the inconveniences and hazards that may reasonably be expected have been explained to me by Mr. Robert W. Rose

I have been given an opportunity to ask questions concerning this investigational study. Any such questions were answered to my full and complete satisfaction. Should any further questions arise concerning my rights on study-related injury I may contact

Office of Chief Counsel, Natick Research, Development, and Engineering Center

at Natick, MA 01760 (617) 651-4322

(name and address of hospital & phone number Natick 651-4322)

I understand that I may at any time during the course of this study revoke my consent and withdraw from the study without further penalty or loss of benefits however, I may be ☐ required (military volunteer) or ☐ requested (civilian volunteer) to undergo certain examination if, in the opinion of the attending physician, such examinations are necessary for my health and well-being. My refusal to participate will involve no penalty or loss of benefits to which I am otherwise entitled.

PART B - TO BE COMPLETED BY INVESTIGATOR

INSTRUCTIONS FOR ELEMENTS OF INFORMED CONSENT: (Provide a detailed explanation in accordance with Appendix E, AR 40-58 or AR 70-55.)

--See back of page

(CONTINUE ON REVERSE)

This study is designed to determine your food nutrient consumption when eating in a garrison dining facility and to determine your potential risk of developing cardiac problems in the future. You will be asked to complete questionnaires, provide verbal information, and provide blood samples from either the finger tip or a vein in your arm. Blood samples will be taken only once and there is a small chance of inflammation at the site of the needle puncture. Sanitary techniques will be used and the procedures and safety standards that we use in testing meet with the safety standards set up at USARIEM for Human Research Studies. Doctors at the Fort Jackson Health Clinic will be standing by in the very unlikely event that treatment is required.

Your risk of developing cardiac problems will be determined by comparing your blood cholesterol levels and your background medical information with guidelines established by the National Institute of Health. If your results indicate that some type of treatment is required you will be notified. The results obtained from this study are only preliminary and do not constitute a final medical diagnosis.

Food consumption will be determined by two different methods. We will be monitoring actual observed food consumption for a small group of volunteers for 3 meals/day for 7 days plus 2 meals. The small group will be asked to show their trays of food to data collectors before eating and again after eating. We will work quickly so that your food will not get cold. A larger group will be asked to complete a food diary after each meal for 3 meals/day for 3 days. The results from both methods will be compared with military guidelines for optimal nutrient intakes to determine how well the food you have eaten meets nutritional standards.

You will be asked to answer questions about your background, medical history and past dietary patterns and attitudes. This information will help us further analyze your food consumption. You may also be asked to be weighed at the start of the study and again at the end. All data obtained about you as an individual will be considered privileged and held in confidence; you will not be identified in any presentation of the results. Complete confidentiality cannot be promised, particularly to subjects who are military personnel, because information bearing on your health may be required to be reported to appropriate medical or Command authorities, and applicable regulation notes the possibility that the Food and Drug Administration and U.S. Army Medical Research and Development Command officials may inspect the records."

You will receive no direct benefits from your participation in this study other than a blood cholesterol value and the knowledge and experience you may gain from the study procedures. If you have any questions concerning the study or the results obtained, please contact the primary individual responsible for the study: Mr. Robert Rose. He will be present at Fort Jackson during the study. His permanent duty station is Military Nutrition Division, U.S. Army Research Institute of Environmental Medicine, Natick, MA 01760-5007. Autovon telephone number is 256-4803.

We ask you to be conscientious in providing complete information, as your cooperation is crucial to the success of the study. If a blood sample is needed, approximately 1 tablespoon of blood will be taken.

You will be given a copy of this form for your records.

SIGNATURE OF VOLUNTEER	DATE SIGNED	SIGNATURE OF CLERK GUARDIAN if volunteer is a minor	
PERMANENT ADDRESS OF VOLUNTEER	TYPED OR PRINTED NAME AND SIGNATURE OF WITNESS		DATE SIGNED

VOLUNTEER REGISTRY DATA SHEET

THIS FORM IS AFFECTED BY THE PRIVACY ACT OF 1974

1. **AUTHORITY:** 5 USC 301; 10 USC 1071-1090; 44 USC 3101; EO 9397
2. **Principal and Routine Purpose:** To document participation in research conducted or sponsored by the U.S. Army Medical Research and Development Command. Personal information will be used for identification and location of participants.
3. **Mandatory or Voluntary Disclosure:** The furnishing of the SSN is mandatory and necessary to provide identification and to contact you if future information indicates that your health may be adversely affected. Failure to provide the information may preclude your participation in the research study.

PART A- INVESTIGATOR INFORMATION

(To Be Completed By Investigator)

PLEASE PRINT, USING INK OR BALLPOINT PEN

1. Study NR: 88-5 2. Protocol Title: Nutritional Assessment and Cardiac Risk Appraisal of U.S. Army Basic Trainees.
3. Contractor (Laboratory/Institute Conducting Study):
4. Study Period: From: 31/07/88 To: 17/08/88
(DAY/MO/YR) (DAY/MO/YR)
5. Principal/Other Investigator(s) Names(s)
- | | | |
|--------------------|----------------|-------------|
| (1) <u>Rose</u> | <u>Robert</u> | <u>W.</u> |
| (1a) <u>(Last)</u> | <u>(First)</u> | <u>(MI)</u> |
| (2) <u>Szeto</u> | <u>Eileen</u> | <u>G.</u> |
| (3) <u>Baker</u> | <u>Carol</u> | <u>J.</u> |
6. Location/Laboratory
- USARIEM/ Military Nutrition Div.
- USARIEM/ Military Nutrition Div.
- USARIEM/ Military Nutrition Div.

PART B-VOLUNTEER INFORMATION

(To Be Completed By Volunteer)

PLEASE PRINT, USING INK OR BALLPOINT PEN

7. SSN: _____ / _____ / _____
8. Name: _____
(Last) (First) (MI)
9. Sex: M_F 10. Date of Birth: ____/____/____
11. *MOS/Job Series: _____
12. *Rank/Grade: _____
13. Permanent Home Address (Home of Record) or Study Location Address:
- _____ (Street) _____ (P.O. Box/Apartment No.)
- _____ (City) _____ (Country) _____ (State) _____ (Zip Code)
- () _____
(Perm Home Phone No)
14. *Local Address (If Different From Permanent Address):
- _____ (Street) _____ (P.O. Box/Apartment No.)
- _____ (City) _____ (Country) _____ (State) _____ (Zip Code)
- () _____
(Local Phone No)
15. *Military Unit: _____ Zip Code: _____
- Organization: _____ Post: _____ Duty Phone No. () _____

PART C-ADDITIONAL INFORMATION
(To Be Completed By Investigator)

PLEASE PRINT, USING INK OR BALLPOINT PEN

16. Location of Study: _____

17. Is Study Completed: Y___ N___

Did volunteer finish participation: Y___ N___ If YES, Date finished: / /
(DAY/MO/YR)

If NO, Date withdrawn: / / Reason withdrawn: _____
(DAY/MO/YR)

18. Did Any Serious or Unexpected Adverse Incident or Reaction Occur: Y___N___ If YES, Explain: _____

19.*Volunteer Followup: _____

Purpose: _____

Date: / / Was contact made: Y___N___ If No action taken, explain:
(DAY/MO/YR)

20.*Hard Copy Records Retired: Place: _____ File NR: _____

21.*Product Information:

Product: _____

Manufacturer: _____

Lot NR: _____ Expiration Date: _____

NDA NR: _____ IND/IDE NR: _____

*Indicates that item may be left blank if information is unavailable or does not apply.
Entries must be made for all other items.

APPENDIX F - SAMPLE OF DEMOGRAPHIC AND
DIET HISTORY QUESTIONNAIRE

I. Background information: This section provides information that enables us to group individuals with similar backgrounds together in our analyses.

II. Medical History: This section provides information that will be used to help us interpret the results of your blood analysis.

III. Diet History: This section provides information that enables us to analyze your dietary intakes and group together individuals with similar dietary habits. Please answer each question to reflect your actual dietary practices.

Read each question carefully and fill in the space provided with your responses. Certain questions have specific instructions associated with them. Please read these instructions carefully. Please answer each question.

Name _____

Company _____

I. Background information:

Subject No. (to be supplied by testers) _____

1. Indicate AGE at last birthday. _____

2. Indicate your SEX. _____

3. Check the space next to your RACE/ETHNIC BACKGROUND.

____ Caucasian
____ Black
____ Oriental

____ Hispanic
____ Other (Specify) _____

4. What is your current HEIGHT? _____ WEIGHT? _____

5. How much did you weigh when you entered the Army? _____

6. Are you trying to lose weight? _____ (1) Yes _____ (2) No
How much? _____

7. Are you trying to gain weight? _____ (1) Yes _____ (2) No
How much? _____

8. Indicate your HIGHEST LEVEL OF EDUCATION

- ____ (1) Some grade school
- ____ (2) Finished grade school
- ____ (3) Some High School
- ____ (4) High School Graduate (includes GED)
- ____ (5) Skilled Job Training
- ____ (6) Some College
- ____ (7) College Graduate

9. How long have you been in MILITARY SERVICE?
____ years ____ months ____ days

10. What is your Army RANK? _____

11. What JOB (mos) do you plan to do in the Army? _____

12. What is your MARITAL STATUS?

- ____ (1) Single, never married and not living as married
- ____ (2) Married or living as married
- ____ (3) Separated and not living as married
- ____ (4) Divorced and not living as married
- ____ (5) Widow/Widower and not living as married

MATICK Form 708 (ONE-TIME)
1 Jul 88

13. In what REGION OF THE COUNTRY did you LIVE THE LONGEST before you joined the Service? (choose one)

- ☐ (1) New England (ME, NH, VT, MA, RI, CT)
- ☐ (2) Middle Atlantic (NY, NJ, PA)
- ☐ (3) East North Central (OH, IN, IL, MI, WI)
- ☐ (4) West North Central (MN, IA, MO, SD, NB, KS)
- ☐ (5) South Atlantic (DE, MD, DC, VA, WV, NC, SC, GA, FL)
- ☐ (6) East South Central (KY, TN, AL, MS)
- ☐ (7) West South Central (AK, LA, OK, TX)
- ☐ (8) Mountain (MT, ID, WY, CO, NM, AZ, UT, NV)
- ☐ (9) Pacific (WA, OR, CA, AK, HI)
- ☐ (10) Other (Territories, Possessions, or Countries)

II. Medical History

14. Have you been informed in the last 5 years that your blood pressure was high or borderline high?
- ____(1) No ____ (2) Yes, high
 ____ (3) Yes, borderline
15. Are you being treated for high blood pressure?
- ____(1) Yes ____ (2) No
16. What is your blood cholesterol level?
- ____(1) Never had it measured
____(2) I had it measured but don't remember
____(3) Under 200mg%
____(4) Between 200 and 250mg%
____(5) Over 250mg%
17. Have any of your close blood relatives (parent, grandparent, brother, or sister) had a HEART ATTACK before age 60?
- ____(1) Yes ____ (2) No ____ (3) Don't know
18. Have any of your close blood relatives (parent, grandparent, brother, or sister) had a STROKE before age 60?
- ____(1) Yes ____ (2) No ____ (3) Don't know
19. Have any of your close blood relatives (parent, grandparent, brother, or sister) had HIGH BLOOD PRESSURE before age 60?
- ____(1) Yes ____ (2) No ____ (3) Don't know
20. Have any of your close blood relatives (parent, grandparent, brother, or sister) had DIABETES?
- ____(1) Yes ____ (2) No ____ (3) Don't know
21. Have any of your close blood relatives (parent, grandparent, brother, or sister) had high blood cholesterol levels?
- ____(1) Yes ____ (2) No ____ (3) Don't know

22. Do you smoke cigarettes now?

- ____(1) Yes* ____ (2) No, "I quit in the last 6 months"***
____(3) No, "I quit over 6 months ago"***
____(4) No, "I quit at the start of basic"***
____(5) No, "I never smoked"

* Answer #23

** Answer #24

23. How much do you smoke now?

- ____(1) "I don't smoke" ____ (2) Less than a half-pack a day
____(3) One-half to one pack a day
____(4) One to two packs a day
____(5) Two or more packs a day

24. How much did you smoke before you quit?

- ____(1) "I don't smoke" ____ (2) Less than a half-pack a day
____(3) One-half pack a day
____(4) One to two packs a day
____(5) Two or more packs a day

25. How long have you or did you smoke?

- ____(1) "I don't smoke" ____ (2) less than 1 year
____(3) 2 - 4 years
____(4) 5 - 10 years
____(5) More than 10 years

26. Do you want to stop smoking?

- ____(1) "I don't smoke" ____ (2) "I would like to quit NOW"
____(3) "I would like to quit SOMEDAY"
____(4) "I don't want to stop smoking"

27. How often do you smoke a pipe or cigar?

- ____(1) Never ____ (2) Less than daily
____(3) Daily

28. How often do you use smokeless tobacco such as chewing tobacco or snuff?

- ____(1) Never ____ (2) Less than daily
____(3) Daily

29. Respond to this statement only if you quit smoking at the start of basic training. "After basic training I intend to continue to SMOKE cigarettes."

- ____(1) Yes ____ (2) No ____ (3) Don't know

30. In a typical week, how many days do you have at least one drink of alcohol (beer, wine, or liquor)?

- ____(1) "I don't drink" ____ (2) 6 or 7 days per week
 ____ (3) 3 to 5 days per week
 ____ (4) 1 to 2 days per week
 ____ (5) Not even 1 day every week

31. In a typical week, how many drinks do you usually drink?

- ____(1) "I don't drink" ____ (2) 4 or less
 ____ (3) 5 to 12
 ____ (4) 13 to 20
 ____ (5) 21 to 30
 ____ (6) More than 30

32. Before coming into the Army, how often did you do at least 20 minutes of non-stop aerobic activity (vigorous exercise that greatly increases your breathing and heart rate such as running, fast walking, biking, swimming, rowing, etc.)?

- ____(1) 3 or more times per week
____(2) 1 or 2 times per week
____(3) rarely or never

33. Before coming into the Army, how often did you do exercises that improve muscle strength, such as pushups, sit-ups, weight lifting, a Nautilus/Universal workout, resistance training, etc.?

- ____(1) 3 or more times a week
____(2) 1 or 2 times a week
____(3) rarely or never

34. Females only: Do you take birth control pills?

- ____(1) No ____ (2) Yes
 Specify type _____

III. Diet History

35. Before coming into the Army, how often did you eat at least TWO WELL-BALANCED meals per day?

____(1) Daily or almost daily ____ (3) Less than 3 days per week
____(2) 3 to 5 days a week ____ (4) Rarely or never

36. Before coming into the Army, how often did you eat food such as beef, hamburger, pork, sausage, etc.?

____(1) Daily or almost daily ____ (3) Less than 3 days a week
____(2) 3 to 5 days a week ____ (4) Rarely or never

37. Before coming into the Army, how often did you eat foods such as butter, whole milk, cheese, ice cream, etc.?

____(1) Daily or almost daily ____ (3) Less than 3 days a week
____(2) 3 to 5 days a week ____ (4) Rarely or never

38. Before coming into the Army, how often did you eat foods such as chicken, fish, etc.?

____(1) Daily or almost daily ____ (3) Less than 3 days a week
____(2) 3 to 5 days a week ____ (4) Rarely or never

39. Before coming into the Army, how often did you eat food such as pinto beans, baked beans, red beans, etc.?

____(1) Daily or almost daily ____ (3) Less than 3 days a week
____(2) 3 to 5 days a week ____ (4) Rarely or never

40. Before coming into the Army, how often did you eat foods such as whole grain breads, cereals, rice, pasta etc.?

____(1) Daily or almost daily ____ (3) Less than 3 days a week
____(2) 3 to 5 days a week ____ (4) Rarely or never

41. Before coming into the Army, how often did you eat foods such as raw fruit, raw vegetables, salad, etc.?

____(1) Daily or almost daily ____ (3) Less than 3 days a week
____(2) 3 to 5 days a week ____ (4) Rarely or never

42. Before coming into the Army, how often did you eat foods such as cold cuts, bacon, cured ham, etc.?

____(1) Daily or almost daily ____ (3) Less than 3 days a week
____(2) 3 to 5 days a week ____ (4) Rarely or never

43. Before coming into the Army, how often did you eat foods such as potato chips, corn chips, tortilla chips, etc.?

- | | |
|--|--|
| <input type="checkbox"/> (1) Daily or almost daily | <input type="checkbox"/> (3) Less than 3 days a week |
| <input type="checkbox"/> (2) 3 to 5 days a week | <input type="checkbox"/> (4) Rarely or never |

44. How much milk do you drink in an average day?

- ☐ (1) None
- ☐ (2) 1/2 glass
- ☐ (3) 1 glass
- ☐ (4) 1 1/2 glasses
- ☐ (5) 2 glasses
- ☐ (6) More than 2 glasses

45. When you drink milk, what type do you usually drink?

- ☐ (1) "I don't drink milk"
- ☐ (2) Whole milk
- ☐ (3) Lowfat milk
- ☐ (4) Skim milk
- ☐ (5) Chocolate milk
- ☐ (6) Buttermilk

46. How many visible eggs do you eat in an average week?

- ☐ (1) None
- ☐ (2) 1-2 eggs per week
- ☐ (3) 3 eggs per week
- ☐ (4) 4-6 eggs per week
- ☐ (5) 7-10 eggs per week
- ☐ (6) More than 10 eggs per week

47. "I eat more fried chicken than baked chicken."

- ☐ (1) "I don't eat chicken."
- ☐ (2) Yes
- ☐ (3) No
- ☐ (4) About even

48. "I eat more french fried potatoes than baked or boiled potatoes (mashed potatoes)."

- ☐ (1) "I don't eat potatoes."
- ☐ (2) Yes
- ☐ (3) No
- ☐ (4) About even

49. "I eat more baked fish than fried fish."

- ☐ (1) "I don't eat fish."
- ☐ (2) Yes
- ☐ (3) No
- ☐ (4) About even

50. Before coming into the Army, "I usually ate breakfast."

- ☐ (1) Daily or almost daily
- ☐ (2) 3 to 5 days a week
- ☐ (3) Less than 3 days a week
- ☐ (4) Rarely or never

51. Before coming into the Army, "I usually ate lunch."

- ☐ (1) Daily or almost daily
- ☐ (2) 3 to 5 days a week
- ☐ (3) Less than 3 days a week
- ☐ (4) Rarely or never

52. Before coming into the Army, "I usually ate dinner."

- ☐ (1) Daily or almost daily
- ☐ (2) 3 to 5 days a week
- ☐ (3) Less than 3 days a week
- ☐ (4) Rarely or never

APPENDIX G - OTSG REQUEST TO COLLECT
TIME DATA ON BASIC TRAINEES

DoD Food and Nutrition RDT&E Requirements FY 91

Nutrition Research

SUBJECT: Garrison Dining Facility Study of Basic Trainee Population

1. Statement of Need:

a. **Statement of Requirement:** A need exists for an assessment of nutrient intakes of basic trainees during BCT. Garrison dining facility studies have been conducted at FT Riley, KS; FT Lewis, WA, and FT Devens MA. Because of the unique requirements and time restrictions in the BCT environment, it is anticipated that the impact of nutrition initiatives and subsequent soldier caloric and nutrient intake may vary from the populations studied previously. In order to make sound recommendations for change in training practices that impact on nutrition and possibly meal schedules, additional information is needed.

b. **Priority:** Urgent

2. Time Frame: FY 92

3. **Threat/Operational Deficiency:** DA Food Service staff have sought to change practices in garrison dining facilities serving basic trainees. However because no detriment to soldier health and performance has been shown, commanders have permitted no significant changes. Trainees are allowed minimum time to consume meals with little opportunity to select from the many options available.

4. **Operational Concept:** The product of this effort will result in recommended changes to policies governing garrison dining facilities for basic trainees.

5. **Essential Characteristics:** Issues to be investigated include: caloric and nutrient intakes of basic trainees compared to soldiers in a more typical military environment; time allowed for meal consumption; and a blood cholesterol and triglyceride analysis to determine the percentage of this unique population that exceed the desirable level of 200 milligrams of serum cholesterol per deciliter of blood.

6. **Technical Assessment:** Effort to be conducted by USARIEM with support from USANRDEC as required.

7. **Cost Estimate:** To be determined by laboratory.

8. **Originating Agency:** HQDA, Office of the Surgeon General (DASG-DBD)

APPENDIX H - SAMPLE OF QUESTIONNAIRE ON
NUTRITION KNOWLEDGE, ATTITUDES, AND AWARENESS

Read each question carefully and fill in the space provided with your responses.

Use a No. 2 pencil. Completely erase all stray marks and changes.

DO NOT USE



3. Indicate age at your last birthday.

35-44
45-54
55+

- ☐ Caucasian
☐ Black
☐ Oriental

☐ Hispanic
☐ Other (Please specify) _____

10. If you are trying to lose weight show how much by filling in a circle below.

12. If you are trying to gain weight show how much by filling in a circle below.
- | | | | |
|-----------------------------------|------------------------------------|------------------------------------|-----------------------------------|
| <input type="radio"/> 5 to 10 lbs | <input type="radio"/> 11 to 20 lbs | <input type="radio"/> 21 to 30 lbs | <input type="radio"/> over 31 lbs |
|-----------------------------------|------------------------------------|------------------------------------|-----------------------------------|

- DO NOT WRITE BELOW THIS LINE

[illegible]

14. What was your low weight this past year? _____
What was your high weight this past year? _____

15. What is your highest level of education? Choose only one.

- ☐ Some grade school
☐ Finished grade school
☐ Some High School
☐ High school graduate (includes GED)
☐ Skilled Job Training
☐ Some college (includes Associates Degree)
☐ College Graduate

16. In what area of the country did you live the longest prior to age 16?

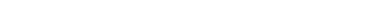
- ☐ New England (ME, NH, VT, MA, RI, CT)
☐ Northeastern (NJ, NY, PA)
☐ Southeastern (MD, DE, DC, VA, WV, NC, SC, GA, FL)
☐ South Central (KY, TN, AL, MS, AR, LA)
☐ Great Lakes (OH, MI, IN, IL, WI)
☐ Plains (ND, SD, IA, MO, MN, NE)
☐ Southwestern (TX, OK, NM, AZ, UT, CO, KS)
☐ Rocky Mountain (ID, MT, WY)
☐ Pacific (WA, OR, CA, NV, HI, AK)
☐ Other U.S. territories or possessions (example: PR, VI)

17. How long have you been in the MILITARY SERVICE? YEARS _____ MONTHS _____

18. How much do you like MILITARY SERVICE?

- [illegible]

19. What is your present rank?

- E** **1** **2** **3** **4** **5** **6** **7** **8** **9**
- 

20. What ONE TYPE OF COOKING were you raised on? Fill in only one circle.

10. What ONE TYPE OF COOKING DO YOU PREFER?
- | | | | |
|--|--------------------------------|-----------------------------------|--|
| <input type="radio"/> Chinese | <input type="radio"/> German | <input type="radio"/> Jewish | <input type="radio"/> Soul |
| <input type="radio"/> English | <input type="radio"/> Greek | <input type="radio"/> Mexican | <input type="radio"/> Southern |
| <input type="radio"/> French | <input type="radio"/> Italian | <input type="radio"/> New England | <input type="radio"/> Spanish (not Mexican) |
| <input type="radio"/> General American Style | <input type="radio"/> Japanese | <input type="radio"/> Polish | <input type="radio"/> Other (Please Specify) |

DO NOT WRITE BELOW THIS LINE

[illegible]

21. Prior to entering military service, where did you usually eat?

	BREAKFAST	LUNCH	DINNER
at a Private residence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
at a club/restaurant/snack shop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
at the dormitory	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bought food at vending machines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bought food at a mobile truck	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Skipped the meal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify) _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. Listed below are some general areas of concern. In your opinion, for each item indicate whether you think it is a significant problem, a minor problem, neither a problem nor an attraction, a minor attraction, or a significant attraction for the Ft. Jackson dining facility.

	SIGNIFICANT PROBLEM	MINOR PROBLEM	NEITHER PROBLEM NOR ATTRACTION	MINOR ATTRACTION	SIGNIFICANT ATTRACTION
convenience of location	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
general dining facility environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
number of available seats	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
air quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
monotony of same facility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
quality of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
quantity of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
dining hall staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
number of items per meal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
appearance of dining areas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
speed of service or waiting lines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
length of time allotted for meals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How often do you:

NEVER 0	RARELY 1	SOMETIMES 2	OCCASIONALLY 3	FREQUENTLY 4	VERY FREQUENTLY 5	ALMOST ALWAYS 6	ALWAYS 7
23. use the dining facility salad bar?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. choose food based on what you like?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25. choose food because of its nutritional value?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26. choose food because it looks good?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27. take advantage of the low calorie menu, if available?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28. eat food at the table without tasting it?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

DO NOT WRITE BELOW THIS LINE

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------

Before you entered the army:

29. How often did you drink low fat milk?

☐ never ☐ monthly ☐ weekly ☐ daily ☐ twice a day
or more

30. How often did you drink whole milk?

☐ never ☐ monthly ☐ weekly ☐ daily ☐ twice a day
or more

31. How much milk did you drink in an average day?

☐ none ☐ 1/2 glass ☐ 1 glass
☐ 1 1/2 glasses ☐ 2 glasses ☐ more than 2 glasses

Please answer the following questions by filling in the circle below the number that best represents your attitude.

NOT AT ALL IMPORTANT	VERY UNIMPORTANT	MODERATELY UNIMPORTANT	SLIGHTLY UNIMPORTANT	NEITHER	SLIGHTLY IMPORTANT	MODERATELY IMPORTANT	VERY IMPORTANT
0	1	2	3	4	5	6	7

32. How important is salt to your enjoyment of food? ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

33. How important is sugar to your enjoyment of food? ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

II Nutrition Knowledge. This portion provides information related to overall nutrition knowledge. We do not expect you to know all the correct answers.

Please fill in the circle next to the correct answer for each question. Give only one answer for each question.

34. Fast food meals are usually:

- ☐ high in protein and low in salt
- ☐ not at all nutritious
- ☐ high in salt and fat
- ☐ high in sugar and low in fat
- ☐ high in fat

35. Calcium:

- ☐ is a major source of energy
- ☐ helps build bones and teeth
- ☐ is found primarily in eggs
- ☐ is found primarily in fruits
- ☐ is toxic in your diet

36. Protein is found in:

- ☐ vegetable oil
- ☐ meats, fish and poultry
- ☐ fruits
- ☐ meats only
- ☐ none of the above

37. Carbohydrates are:

- ☐ found in grains
- ☐ higher in calories than fats
- ☐ building blocks of protein
- ☐ found in meats
- ☐ higher in calories than protein

38. Lean meats are a good source of:

- ☐ vitamin E
- ☐ the B vitamins
- ☐ vitamin C
- ☐ vitamin D
- ☐ carbohydrates

39. Iron:

- ☐ is found in cheese
- ☐ is a kind of vitamin
- ☐ is found in salt
- ☐ is found in whole grains and red meats
- ☐ none of the above

40. Low fat milk has:

- ☐ fewer calories than whole milk
- ☐ less cholesterol than whole milk
- ☐ as much calcium and protein as whole milk
- ☐ a and b only
- ☐ all of the above

42. Which food is in the SAME food group as chicken?

- ☐ yogurt
- ☐ fish
- ☐ potatoes
- ☐ apples
- ☐ cereal

44. Which food is LOWEST in sodium (salt)?

- ☐ american cheese
- ☐ baked potato
- ☐ canned tomato soup
- ☐ bolonga
- ☐ corn flakes

46. Which of the following is NOT a good source of fiber?

- ☐ carrots
- ☐ popcorn
- ☐ steaks
- ☐ almonds
- ☐ celery

41. Which nutrient gives the MOST energy (calories) per ounce?

- ☐ fat
- ☐ protein
- ☐ carbohydrate
- ☐ sugar
- ☐ vitamins

43. Which entree is the BEST choice for a reducing diet?

- ☐ fried chicken
- ☐ broiled fish
- ☐ broiled steak
- ☐ macaroni and cheese
- ☐ ham and cheese sandwich

45. Young adult men of average weight and low activity should consume about how many calories per day?

- ☐ 500
- ☐ 1000
- ☐ 3000
- ☐ 5000
- ☐ 7000

47. What are the four major food groups?

- ☐ proteins, grains and cereals, milk products, meats
- ☐ milk products, grains and cereals, fruits and vegetables, meats
- ☐ fruits, vegetables, milk products, proteins
- ☐ milk products, grains and cereals, fats and oils, meats
- ☐ none of the above

- 48. Water is essential for the body to function properly.
- 49. Fat has more than twice the calories as carbohydrates.
- 50. It is necessary to take a vitamin pill to obtain all the essential nutrients.
- 51. The ingredients listed on food labels are arranged in order of decreasing quantity.
- 52. When you're physically active, you need more calories than when you're inactive.
- 53. Ice cream is a good source of calcium.
- 54. Margarine has less calories than butter.

TRUE

FALSE

- | | |
|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/> | <input type="radio"/> |

55. Eating which of these items would help you practice better nutrition? Choose a food from either column A or B; (e.g. choose between butter and margarine). Do this for each item listed.

A	B
<input type="radio"/> Butter	<input type="radio"/> margarine
<input type="radio"/> low fat (2%) milk	<input type="radio"/> whole milk
<input type="radio"/> unsweetened juice	<input type="radio"/> canned soda
<input type="radio"/> fried foods	<input type="radio"/> baked foods
<input type="radio"/> herbal seasonings	<input type="radio"/> salt
<input type="radio"/> pastries	<input type="radio"/> fresh fruit
<input type="radio"/> chicken with skin	<input type="radio"/> chicken without skin

56. If you are trying to lose weight which item would you choose from column A or B?

A	B
<input type="radio"/> regular menu option	<input type="radio"/> low calorie menu option
<input type="radio"/> fresh fruit	<input type="radio"/> pastries
<input type="radio"/> low calorie dressing	<input type="radio"/> regular dressings
<input type="radio"/> whole milk	<input type="radio"/> low fat (2%) milk
<input type="radio"/> fried food	<input type="radio"/> baked foods
<input type="radio"/> reduced portions	<input type="radio"/> regular portions
<input type="radio"/> potatoes with gravy	<input type="radio"/> potatoes without gravy
<input type="radio"/> Frosted Flakes	<input type="radio"/> Shredded Wheat
<input type="radio"/> chicken with skin	<input type="radio"/> chicken without skin

57. If given the choice between the food in column A or the food in column B, which would you choose?

A	B
<input type="radio"/> baked chicken	<input type="radio"/> fried chicken
<input type="radio"/> low calorie foods	<input type="radio"/> high calorie food
<input type="radio"/> whole milk	<input type="radio"/> low fat milk
<input type="radio"/> non-buttered vegetables	<input type="radio"/> buttered vegetables
<input type="radio"/> fresh fruit	<input type="radio"/> cakes and pies
<input type="radio"/> potatoes with gravy	<input type="radio"/> potatoes without gravy

For each of the items listed below we would like you to use the following scale to rate your agreement or disagreement with the statement. There are no right or wrong answers. We are seeking your opinion.

STRONGLY DISAGREE	DISAGREE	NEUTRAL OR UNDECIDED	AGREE	STRONGLY AGREE
1	2	3	4	5

58. It is important to take additional salt on hot humid days if you are very active and are sweating alot.

1 2 3 4 5

☐ ☐ ☐ ☐ ☐

59. The best way to lose weight is to eat fewer foods that are high in carbohydrates such as bread, pasta, and rolls.

☐ ☐ ☐ ☐ ☐

Please use the scale below to answer the following questions referring to the present dining hall. If your dining hall does not use calorie cards skip to question 61.

	STRONGLY DISAGREE	DISAGREE	NEUTRAL OR UNDECIDED	AGREE	STRONGLY AGREE
	1	2	3	4	5
60. The "calorie cards" help me:					
select food high in nutritional value.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
select food low in calories.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
by decreasing my time in the line.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
61. The current food offered in the dining hall:					
provides a healthful diet.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
helps overweight personnel lose weight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
tastes bland.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
is as nutritious as in a restaurant.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
lets me find a low calorie meal as easily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
as at home or in a restaurant.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
tastes salty.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
62. The information about nutrition I had prior					
to joining military service:					
has influenced my food choices at restaurants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
and at home.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
has increased my awareness of proper nutrition.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
has improved my attitude toward proper nutrition.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
63. The Army supplies nutritional information:					
to help us choose more nutritious foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
to help Army personnel reach and maintain optimal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
weight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
64. Proper nutrition:					
is important to overall health.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
is important to overall fitness.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

65. How much would you like to weight? _____ lbs

Prior to joining military service:

66. Did you exercise/workout? ☐ YES ☐ NO

67. If you answered yes to #66 please check the exercises you did on a regular basis.

<input type="radio"/> jog/run	<input type="radio"/> racquet sports (tennis, racketball)
<input type="radio"/> bike	<input type="radio"/> swim
<input type="radio"/> lift weights	<input type="radio"/> calisthenics
<input type="radio"/> aerobics	<input type="radio"/> other sports

DO NOT WRITE BELOW LINE

.....

[illegible][illegible][illegible][illegible][illegible]

APPENDIX I - RATION RECORD DATA COLLECTION FORM

RATION RECORD

NAME: _____

DATA COLLECTOR # _____

SUBJECT #: _____

DATA ENTERER # _____

JULIAN DATE: 85 _____

MEAL: (CIRCLE ONE)

RATION TYPE: (CIRCLE ONE)

BREAKFAST - B

A

B

T

DINNER - D

FOOD TYPE	DESCRIPTION	CODE #	REASON NOT EATEN CODE	PORTION SERVED	PORTION RETURNED	RATING CODE

ENTREE	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
VEGETABLE	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
STARCH	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
FRUIT	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
BREAD	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
SPREAD	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
DESSERT	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
BEVERAGE	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
OTHER	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____

APPENDIX J - MRE DATA COLLECTION FORMS

NAME _____

SUBJECT NUMBER: _____

9 August 1988 LUNCH

Please circle the amount of each MRE item that you ate.

CODE	FOOD	AMOUNT	CONSUMED
366	BEEF W/BBQ SAUCE	ALL 3/4	1/2 1/4
367	FRANKFURTERS	ALL 3/4	1/2 1/4
368	CHICKEN/HAM LOAF	ALL 3/4	1/2 1/4
369	BEEF W/GRAVY	ALL 3/4	1/2 1/4
370	BEEF W/SPICED SAUCE	ALL 3/4	1/2 1/4
371	BEEF PATTY	ALL 3/4	1/2 1/4
372	BEEF STEW	ALL 3/4	1/2 1/4
373	CHICKEN ALA KING	ALL 3/4	1/2 1/4
374	HAM SLICE	ALL 3/4	1/2 1/4
375	MEATBALLS W/BBQ SAUCE	ALL 3/4	1/2 1/4
376	PORK SAUSAGE PATTY	ALL 3/4	1/2 1/4
377	TURKEY W/GRAVY	ALL 3/4	1/2 1/4
378	CRACKERS	ALL 3/4	1/2 1/4
379	POTATO PATTY	ALL 3/4	1/2 1/4
380	BEANS W/TOMATO SAUCE	ALL 3/4	1/2 1/4
381	CHEESE	ALL 3/4	1/2 1/4
382	JELLY	ALL 3/4	1/2 1/4
383	PEANUT BUTTER	ALL 3/4	1/2 1/4
384	APPLESAUCE	ALL 3/4	1/2 1/4
385	FRUIT MIX	ALL 3/4	1/2 1/4
386	PEACHES	ALL 3/4	1/2 1/4
387	STRAWBERRIES	ALL 3/4	1/2 1/4
388	PEARS	ALL 3/4	1/2 1/4
389	CHOCOLATE COVERED BROWNIES	ALL 3/4	1/2 1/4
390	CHERRY NUT CAKE	ALL 3/4	1/2 1/4
391	CHOCOLATE COVERED COOKIE BAR	ALL 3/4	1/2 1/4
392	CHOCOLATE NUT CAKE	ALL 3/4	1/2 1/4
393	MAPLE NUT CAKE	ALL 3/4	1/2 1/4
394	FRUIT CAKE	ALL 3/4	1/2 1/4
395	ORANGE NUT CAKE	ALL 3/4	1/2 1/4
396	PINEAPPLE NUT CAKE	ALL 3/4	1/2 1/4
397	COFFEE	ALL 3/4	1/2 1/4
398	CREAM SUBSTITUTE	ALL 3/4	1/2 1/4
399	SUGAR	ALL 3/4	1/2 1/4
400	COCOA	ALL 3/4	1/2 1/4
401	CATSUP	ALL 3/4	1/2 1/4
402	SOUP MIX (BROTH)	ALL 3/4	1/2 1/4
403	CANDY (ALL TYPES)	ALL 3/4	1/2 1/4
404	GUM	ALL 3/4	1/2 1/4
405	SALT	ALL 3/4	1/2 1/4

APPENDIX K - DINING FACILITY MENU

Dining Facility Menu

DAY 1

Breakfast	Lunch	Dinner
Toast Oatmeal Grits Bacon Saus Patty Gr1 Bologna Pancakes French Toast Hrd Boil Egg Scrambled Eggs Hot Maple Syrup Peanut Butter Apple Sauce Cottage Cheese Cnd Peaches Cnd Pears Cnd Pineapple Raisins Orange Juice Grape Juice Raisin Bran Rice Krispies Corn Flakes Honey Jam/Jelly Asst Fresh Fruit Skim Milk 2% White Milk 2% Chocolate Milk Low Fat Yogurt Asst Bread Margarine Patties Coffee/Tea Condiments Herb Mix.	Brs Pork Chop Beef Stew Brn Grvy Mash Pot Stm Rice Corn Peas W/ Mshrm Cake L/O Turkey L/O Rice Pilaf Carrot & Raisin Salad Potato Salad Macaroni Salad Cottage Cheese W/ Fruit Jellied Fruit Salad Cole Slaw W/ Creamy Dress. Shredded Lettuce Chopped Hard Cooked Eggs Olives (Green & Black) Pickles (Sweet & Dill) Chow Mein Noodles Mushrooms Cheese, Block Bacon Bits Sliced Cucumbers Sliced Onion Tomato Wedges Shredded Carrots Asst Dressings Asst Lo-Cal Dressings Saltines Asst Fresh Fruit Koolaid Iced Tea Sodas Skim Milk 2% White Milk 2% Chocolate Milk Coffee/Tea Low Fat Yogurt Asst Bread Margarine Patties Herb Mix. Condiments	Fr Fr Fish Baked Ham French Fries Fried Rice Cauliflower Lyon Wax Beans L/O Pork Chops L/O Peas W/ Mshrm Carrot & Raisin Salad Potato Salad Macaroni Salad Cottage Cheese W/ Fruit Jellied Fruit Salad Cole Slaw W/ Creamy Dress. Shredded Lettuce Chopped Hard Cooked Eggs Olives (Green & Black) Pickles (Sweet & Dill) Chow Mein Noodles Mushrooms Cheese, Block Bacon Bits Sliced Cucumbers Sliced Onion Tomato Wedges Shredded Carrots Asst Dressings Asst Low-Cal Dressings Saltines Asst Fresh Fruit Koolaid Iced Tea Sodas Skim Milk 2% White Milk 2% Chocolate Milk Coffee/Tea Low Fat Yogurt Asst Bread Margarine Patties Herb Mix. Condiments

L/O = Left Over

Dining Facility Menu

DAY 2

Breakfast	Lunch	Dinner
Toast Grits Oatmeal Hsh Brn Pot Bacon Saus Patty Bologna Pancakes Waffles Hrd Boil Egg Scrambled Eggs Hot Maple Syrup Peanut Butter Apple Sauce Cottage Cheese Cnd Peaches Cnd Pears Cnd Pineapple Raisins Orange Juice Grape Juice Raisin Bran Rice Krispies Corn Flakes Honey Jam/Jelly Asst Fresh Fruit Skim Milk 2% White Milk 2% Chocolate Milk Low Fat Yogurt Asst Bread Margarine Patties Coffee/Tea Condiments Herb Mix.	Veal Patty Swiss Steak Rst Turkey Cranberry Sauce Brn Grvy Noodles Rissolle Pot Mash Pot Herb Grn Bns Mix Veg Cake L/O Pork Chop L/O Peas W Mshrm Carrot & Raisin Salad Potato Salad Macaroni Salad Cottage Cheese W/ Fruit Jellied Fruit Salad Co'e Slaw W/ Creamy Dress. Shredded Lettuce Chopped Hard Cooked Eggs Olives (Green & Black) Pickles (Sweet & Dill) Chow Mein Noodles Mushrooms Cheese, Shredded Bacon Bits Sliced Cucumbers Sliced Onion Tomato Wedges Shredded Carrots Asst Dressings Asst Lo-cal Dressings Saltines Asst Fresh Fruit Koolaid Iced Tea Sodas Skim Milk 2% White Milk 2% Chocolate Milk Coffee/Tea Low Fat Yogurt Asst Bread Margarine Patties Herb Mix. Condiments	Veal Patty Baked Fish Brn Grvy Mash Pot Stm Rice Stm Carrots Stm Cabbage L/O Rst Turkey L/O Swiss Steak L/O Mix Veg L/O Herb Grn Bns L/O Lyon Wax Bns Carrot & Raisin Salad Potato Salad Macaroni Salad Cottage Cheese W/ Fruit Jellied Fruit Salad Cole Slaw W/ Creamy Dress. Shredded Lettuce Chopped Hard Cooked Eggs Olives (Green & Black) Pickles (Sweet & Dill) Chow Mein Noodles Mushrooms Cheese, Shredded Bacon Bits Sliced Cucumbers Sliced Onion Tomato Wedges Shredded Carrots Asst Dressings Asst Lo-cal Dressings Saltines Asst Fresh Fruit Koolaid Iced Tea Sodas Skim Milk 2% White Milk 2% Chocolate Milk Coffee/Tea Low Fat Yogurt Asst Bread Margarine Patties Herb Mix. Condiments

L/O = Left Over

Dining Facility Menu

DAY 3

Breakfast	Lunch	Dinner
Toast Oatmeal Grits Bacon Saus Patty Bologna Crm Beef Waffles Pancakes French Toast Hrd Boil Egg Scrambled Eggs Hot Maple Syrup Peanut Butter Apple Sauce Cottage Cheese Cnd Peaches Cnd Pears Cnd Pineapple Raisins Orange Juice Grape Juice Raisin Bran Rice Krispies Corn Flakes Honey Jam/Jelly Asst Fresh Fruit Skim Milk 2% White Milk 2% Chocolate Milk Low Fat Yogurt Asst Bread Margarine Patties Coffee/Tea Condiments Herb Mix.	Polish Saus Sauerkraut Beef Stew Brn Grvy Ovn Brn Pot Stm Rice Harv Beets Stm Greens Cake L/O Carrot Potato Salad Macaroni Salad Cottage Cheese W/ Fruit Jellied Fruit Salad Cole Slaw W/ Creamy Dress. Mixed Fruit Salad Shredded Lettuce Chopped Hard Cooked Eggs Olives (Green & Black) Pickles (Sweet & Dill) Chow Mein Noodles Mushrooms Cheese, Shredded Bacon Bits Sliced Cucumbers Sliced Onion Tomato Wedges Shredded Carrots Asst Dressings Asst Lo-cal Dressings Saltines Asst Fresh Fruit Koolaid Iced Tea Sodas Skim Milk 2% White Milk 2% Chocolate Milk Coffee/Tea Low Fat Yogurt Asst Bread Margarine Patties Herb Mix. Condiments	Bkd Chix Bkd Lasagna Bkd Pot Sour Cream Stm Carrots Stm Corn L/O Beef Stew L/O Polish Sausage L/O Sauerkraut L/O Rice L/O Ovn Brn Pot L/O Greens Carrot & Raisin Salad Potato Salad Macaroni Salad Cottage Cheese W/ Fruit Jellied Fruit Salad Cole Slaw W/ Creamy Dress. 3 Bean Salad Mixed Fruit Salad Shredded Lettuce Chopped Hard Cooked Eggs Olives (Green & Black) Pickles (Sweet & Dill) Chow Mein Noodles Mushrooms Cheese, Shredded Bacon Bits Sliced Cucumbers Sliced Onion Tomato Wedges Shredded Carrots Asst Dressings Asst Lo-cal Dressings Saltines Asst Fresh Fruit Koolaid Iced Tea Sodas Skim Milk 2% White Milk 2% Chocolate Milk Coffee/Tea Low Fat Yogurt Asst Bread Margarine Patties. Herb Mix. Condiments

L/O = Left Over

Dining Facility Menu

DAY 4

Breakfast	Lunch	Dinner
Toast Grits Oatmeal Hsh Brn Pot Bacon Saus Patty Crm Beef Bologna Pancakes Waffles Hrd Boil Egg Scrambled Eggs Hot Maple Syrup Peanut Butter Apple Sauce Cottage Cheese Cnd Peaches Cnd Pears Cnd Pineapple Raisins Orange Juice Grape Juice Raisin Bran Rice Krispies Corn Flakes Honey Jam/Jelly Asst Fresh Fruit Skim Milk 2% White Milk 2% Chocolate Milk Low Fat Yogurt Asst Bread Margarine Patties Coffee/Tea Condiments Herb Mix.	Pork Adobo Swiss Steaks Brn Grvy Stm Rice Mash Pot Stm Grn Bns Stm Asparagus Cake L/O Chix L/O Corn Potato Salad Macaroni Salad Cottage Cheese W/ Fruit Jellied Fruit Salad Mixed Fruit Salad Shredded Lettuce Chopped Hard Cooked Eggs Olives (Green & Black) Pickles (Sweet & Dill) Chow Mein Noodles Mushrooms Cheese, Cubes Bacon Bits Sliced Cucumbers Sliced Onion Tomato Wedges Shredded Carrots Asst Dressings Asst Lo-cal Dressings Saltines Asst Fresh Fruit Koolaid Iced Tea Sodas Skim Milk 2% White Milk 2% Chocolate Milk Coffee/Tea Low Fat Yogurt Asst Bread Margarine Patties Herb Mix. Condiments	Trky Ala King Bkd Ham Stks Veal Patty Brn Grvy Mash Pot Stm Rice Noodles Carrots Cauliflower L/O Pork Adobo L/O Corn Carrot & Raisin Salad Potato Salad Macaroni Salad Cottage Cheese W/ Fruit Jellied Fruit Salad Cole Slaw W/ Creamy Dress. Mixed Fruit Salad Shredded Lettuce Chopped Hard Cooked Eggs Olives (Green & Black) Pickles (Sweet & Dill) Chow Mein Noodles Mushrooms Cheese, Cubes Bacon Bits Sliced Cucumbers Sliced Onion Tomato Wedges Shredded Carrots Asst Dressings Asst Lo-cal Dressings Saltines Asst Fresh Fruit Koolaid Iced Tea Sodas Skim Milk 2% White Milk 2% Chocolate Milk Coffee/Tea Low Fat Yogurt Asst Bread Margarine Patties Herb Mix. Condiments

L/O = Left Over

Dining Facility Menu

DAY 5

Breakfast	Lunch	Dinner
Toast Oatmeal Grits Bacon Saus Patty Crm Beef Grl Bologna Pancakes French Toast Hrd Boil Egg Cheese Omelet Scrambled Eggs Hot Maple Syrup Peanut Butter Apple Sauce Cottage Cheese Cnd Peaches Cnd Pears Cnd Pineapple Raisins Orange Juice Grape Juice Raisin Bran Rice Krispies Corn Flakes Honey Jam/Jelly Asst Fresh Fruit Skim Milk 2% White Milk 2% Chocolate Milk Low Fat Yogurt Asst Bread Margarine Patties Coffee/Tea Condiments Herb Mix.	Chili Ham Steaks Fr Fr Fish Stm Pot Rice Corn Wax Beans Cake Potato Salad Macaroni Salad Cottage Cheese W/ Fruit Cole Slaw W/ Creamy Dress. 3 Bean Salad Shredded Lettuce Chopped Hard Cooked Eggs Olives (Green & Black) Pickles (Sweet & Dill) Chow Mein Noodles Mushrooms Cheese, Cubes Bacon Bits Sliced Cucumbers Sliced Onion Tomato Wedges Shredded Carrots Asst Dressings Asst Lo-cal Dressings Saltines Asst Fresh Fruit Koolaid Ice Tea Sodas Skim Milk 2% White Milk 2% Chocolate Milk Coffee/Tea Low Fat Yogurt Asst Bread Margarine Patties Herb Mix. Condiments	Yan Pot Roast Roast Turkey Cranberry Sauce Brn Grvy Sea Noodles Rice Stm Spinach Savory Beans L/O Ham Steak L/O Stm Pot L/O Corn Carrot & Raisin Salad Potato Salad Macaroni Salad Cottage Cheese W/ Fruit Jellied Fruit Salad Cole Slaw W/ Creamy Dress. 3 Bean Salad Mixed Fruit Salad Shredded Lettuce Chopped Hard Cooked Eggs Olives (Green & Black) Pickles (Sweet & Dill) Chow Mein Noodles Mushrooms Cheese, Cubes Bacon Bits Sliced Cucumbers Sliced Onion Tomato Wedges Shredded Carrots Asst Dressings Asst Lo-cal Dressings Saltines Asst Fresh Fruit Koolaid Iced Tea Sodas Skim Milk 2% White Milk 2% Chocolate Milk Coffee/Tea Low Fat Yogurt Asst Bread Margarine Patties Herb Mix. Condiments

L/O = Left Over

Dining Facility Menu

DAY 6

Breakfast	Lunch	Dinner
Oatmeal Toast Grits Hsh Brn Pot Bacon Saus Patty Crm Beef Bologna Pancakes Waffles Hrd Boil Egg Cheese Omelet Scrambled Eggs Hot Maple Syrup Peanut Butter Apple Sauce Cottage Cheese Cnd Peaches Cnd Pears Cnd Pineapple Raisins Orange Juice Grape Juice Raisin Bran Rice Krispies Corn Flakes Honey Jam/Jelly Asst Fresh Fruit Skim Milk 2% White Milk 2% Chocolate Milk Low Fat Yogurt Asst Bread Margarine Patties Coffee/Tea Condiments Herb Mix.	Grilled Steak Bkd Chicken Brn Grvy Stm Rice Mash Pot Stm Carrots Stm Lima Beans Cake Carrot & Raisin Salad Potato Salad Macaroni Salad Cottage Cheese W/ Fruit Jellied Fruit Salad Cole Slaw W/ Creamy Dress. Mixed Fruit Salad Shredded Lettuce Chopped Hard Cooked Eggs Olives (Green & Black) Pickles (Sweet & Dill) Chow Mein Noodles Mushrooms Cheese, Cubes Bacon Bits Sliced Cucumbers Sliced Onion Tomato Wedges Shredded Carrots Asst Dressings Asst Lo-cal Dressings Saltines Asst Fresh Fruit Koolaid Iced Tea Sodas Skim Milk 2% White Milk 2% Chocolate Milk Coffee/Tea Low Fat Yogurt Asst Bread Margarine Patties Herb Mix. Condiments	Boiled Dinner Span Beef Pat Brn Grvy Stm Rice Mash Pot Stm Peas Stm Broccoli Corn L/O Steak Carrot & Raisin Salad Potato Salad Macaroni Salad Cottage Cheese W/ Fruit Jellied Fruit Salad Cole Slaw W/ Creamy Dress. Mixed Fruit Salad Shredded Lettuce Chopped Hard Cooked Eggs Olives (Green & Black) Pickles (Sweet & Dill) Chow Mein Noodles Mushrooms Cheese, Cubes Bacon Bits Sliced Cucumbers Sliced Onion Tomato Wedges Shredded Carrots Asst Dressings Asst Lo-cal Dressings Saltines Asst Fresh Fruit Koolaid Iced Tea Sodas Skim Milk 2% White Milk Chocolate Milk Coffee/Tea Cocoa Low Fat Yogurt Asst Bread Margarine Patties Herb Mix. Condiments

L/O = Left Over

Dining Facility Menu

DAY 7

Breakfast	Lunch	Dinner
Toast Oatmeal Grits Bacon Saus Patty Crm Beef Bologna Polish Saus Waffles Pancakes French Toast Hrd Boil Egg Cheese Omelet Scrambled Eggs Hot Maple Syrup Peanut Butter Apple Sauce Cottage Cheese Cnd Peaches Cnd Pears Cnd Pineapple Raisins Orange Juice Grape Juice Raisin Bran Rice Krispies Corn Flakes Honey Jam/Jelly Asst Fresh Fruit Skim Milk 2% White Milk 2% Chocolate Milk Low Fat Yogurt Asst Bread Margarine Patties Coffee/Tea Cocoa Condiments Herb Mix	Veal Patty Brs Pork Chop Ovn Brn Pot Rice Pilaf Brussel Sprt Stm Mix Veg Corn Cake L/O Carrots Carrot & Raisin Salad Potato Salad Macaroni Salad Cottage Cheese W/ Fruit Jellied Fruit Salad Cole Slaw W/ Creamy Dress. Mixed Fruit Salad Shredded Lettuce Chopped Hard Cooked Eggs Olives (Green & Black) Pickles (Sweet & Dill) Chow Mein Noodles Mushrooms Cheese, Cubes Bacon Bits Sliced Cucumbers Sliced Onion Tomato Wedges Shredded Carrots Asst Dressings Asst Lo-cal Dressings Saltines Asst Fresh Fruit Koolaid Iced Tea Sodas Skim Milk 2% White Milk 2% Chocolate Milk Coffee/Tea Cocoa Low Fat Yogurt Asst Bread Margarine Patties Herb Mix. Condiments	Beef Cubes Veal Patty Roast Turkey Cranberry Sauce Chix Grvy Mash Pot Stm Noodles Stm Carrots Stm Spinach L/O Pork Chop L/O Rice Pilaf Carrot & Raisin Salad Potato Salad Macaroni Salad Cottage Cheese W/ Fruit Jellied Fruit Salad Cole Slaw W/ Creamy Dress. Shredded Lettuce Chopped Hard Cooked Eggs Olives (Green & Black) Pickles (Sweet & Dill) Chow Mein Noodles Mushrooms Cheese, Cubes Bacon Bits Sliced Cucumbers Sliced Onion Tomato Wedges Shredded Carrots Asst Dressings Asst Lo-cal Dressings Saltines Asst Fresh Fruit Koolaid Iced Tea Sodas Skim Milk 2% White Milk 2% Chocolate Milk Coffee/Tea Cocoa Low Fat Yogurt Asst Bread Margarine Patties Herb Mix. Condiments

L/O = Left Over

APPENDIX L - FIELD MENU

Field Menus

DAY 1 Breakfast	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
	Oatmeal Grits Bacon Sausage Patty Bologna Waffles Syrup Scrambled Egg Hrd Boil Egg Bread/Marg Orange Juice Fresh Fruit				Waffles Syrup Oatmeal Grits Scrambled Egg Gr1 Bologna Hrd Boil Egg Bacon Sausage Bread/Marg Orange Juice Fresh Fruit	French Toast Oatmeal Syrup Scrambled Egg Polish Saus Hrd Boil Egg Waffles Grits Bread/Marg Grape Juice Orange Juice Fresh Fruit
Lunch Brs Pork Chp Beef Stew Brn Grvy Mash Pot Stm Rice. Corn Peas W/ Mshrm Tossed Salad Salad Dress Bread/marg Koolaid Fresh Fruit	Veal Patty Swiss Steaks Brn Grvy Mash Pot Rissolle Pot Herb Grn Bns Mix Veg Wax Beans Tossed Salad Salad Dress Bread/Marg Koolaid Fresh Fruit	Polish Saus Sauerkraut Beef Stew Brn Grvy Ovn Brn Pot Stm Rice Harv Beets Stm Greens Tossed Salad Salad Dress Bread/Marg Koolaid Fresh Fruit	Veal Patty Ham Steak Brn Grvy Mash Pot Rice Carrots Cauliflower Tossed Salad Salad Dress Bread/Marg Koolaid Fresh Fruit	Chili Ham Steaks Bu Pot Stm Rice Corn Grn Beans 3 Bean Salad Tossed Salad Salad Dress Bread/Marg Koolaid Fresh Fruit Tabasco Sauce	Grilled Steak Bkd Chicken Mash Pot Stm Rice Brn Grvy Carrots Lima Bean Tossed Salad Salad Dress Steak Sauce Bread/Marg Koolaid Fresh Fruit	Veal Patty Brs Pork Chop Ovr Brn Pot Rice Pilaf Brus Sprouts Mix Veg Tossed Salad Salad Dress Mix Fruit Sal Bread/Marg Koolaid Fresh Fruit
Dinner			Veal Patty Ham Steak Brn Grvy Mash Pot Rice Carrots Cauliflower Tossed Salad Salad Dress Bread/Marg Koolaid Fresh Fruit		Boiled Dinner Span Beef Pat Brn Grvy Mash Pot Stm Rice Peas Corn Tossed Salad Salad Dress Bread/Marg Koolaid Fresh Fruit	Beef&Noodles Roast Turkey Chix Grvy Mash Pot Steak Sauce Carrots Spinach Tossed Salad Salad Dress Bread/Marg Koolaid Fresh Fruit

APPENDIX M
ANALYSIS OF THE STUDY MENU

The study menus (dining facility and field) were analyzed separately. The analysis of the dining facility menu represents the mean daily nutrients available at three meals per day for seven days. The analysis of the field menu for the individual meals represents the mean nutrients available at the three breakfasts, three dinners, and six lunches served in the field. While no one subject ate all three meals in the field on a given day, the field menu was analyzed for daily means for comparison purposes. This analysis for daily means was based on data for the two days when all three meals were served in the field. This is the first garrison dining facility study that has provided information on the composition of the menu in addition to dietary intake data, so that comparisons could be made between what is available and what is eaten.

Table M-1 presents the mean nutritive values of the study menu for the seven days of the study period. The study menu analysis was based on a calculated average food item from each menu category where only one choice was allowed, plus one serving of all additional items that were served without restriction. Thus, the study menu represents foods that the trainees could have taken. The study menu analysis generated nutrient values which were high in relation to requirements or actual dietary intakes. Sufficient foods and variety were available to meet the MRDA and at least twice as many nutrients that a soldier doing heavy work would need. These values reflected the large quantity and variety of food items offered and would be more than one person would reasonably be expected to select or consume.

Table M-1. Mean Nutrient Value of the Study Menu^a.

	N ^b	ENERGY (kcal)	CARBO- HYDRATE (g)	PROTEIN (g)	FAT (g)	CHOLESTEROL (mg)
DINING FACILITY						
Breakfast	7	2397	347	83	81	552
Lunch	7	2515	290	94	115	375
Dinner	7	2544	297	89	118	372
Total For Day	7	7456	934	267	314	1299
MASTER MENU ^c		4079		129	158	
FIELD						
Breakfast	3	1341	202	35	45	574
Lunch	6	1187	136	44	55	233
Dinner	3	1076	129	32	50	200
Total For Day ^d	2	3654	466	117	153	1036
	N	SODIUM (mg)	POTAS- SIUM (mg)	IRON (mg)	CALCIUM (mg)	PHOSPHORUS (mg)
DINING FACILITY						
Breakfast	7	3612	3028	25	1256	1539
Lunch	7	4557	3239	13	1242	1595
Dinner	7	4739	3304	13	1300	1616
Total For Day	7	12908	9571	50	3798	4749
MASTER MENU ^c				22	2015	
FIELD						
Breakfast	3	2041	1278	20	389	545
Lunch	6	2681	1625	8	224	558
Dinner	3	2554	1510	8	232	518
Total For Day ^d	2	7129	4514	37	853	1670

^aStudy menu obtained by averaging like food items in categories where only one serving would be expected.

^bN indicates the number of meals or days upon which the analyses were based.

^cRefer to reference 3.

^dTotal For Day menu for the field based on the two days for which data for three meals were available.

When the dining facility and field menus were analyzed for calories from protein, fat, and carbohydrate as a percent of total available energy (%PRO, %FAT, and %CHO, respectively), the results were generally similar for the two menus (Table M-2). The %FAT provided by the dining facility or field menu was less at breakfast than at the lunch or dinner meals. The total %FAT provided by the menu was a little greater than the 35% fat recommended for dietary intake in AR 40-25. Available carbohydrate in the dining facility and field menu was greater at breakfast than at lunch or dinner but the total for the day met the 50-55%CHO recommended in the MRDAs. The %PRO provided by the

Table M-2. Caloric Distribution of Protein, Fat, and Carbohydrate in the Study Menu^a.

	%PROTEIN	%FAT	%CARBOHYDRATE
DINING FACILITY			
Breakfast	13.9	30.3	57.9
Lunch	15.0	41.2	46.2
Dinner	14.0	41.8	46.7
Total For Day	14.3	37.9	50.1
FIELD			
Breakfast	10.5	30.4	60.3
Lunch	14.7	41.4	45.7
Dinner	11.9	42.0	48.0
Total For Day ^b	12.8	37.7	51.1

^aStudy menu obtained by averaging like food items in categories where only one serving would be expected.

^bTotal For Day menu for the field based on the two days for which data for three meals were available.

field menus was lower than the dining facility menus since no dairy products were served in the field. The trainees were offered an opportunity to select a well-balanced diet from the dining facility and field menus.

Since the menu analysis yielded nutrient values greater than one person could be expected to select or consume, a nutrient to energy ratio or Nutrient Density Index (NDI) was calculated (nutrient/1000 kcal) for further comparison and discussion. The mean NDI for selected nutrients provided by the study menus are presented in Table M-3.

Compared with the NDI guidelines for a Military Menu in AR 40-25, the mean available nutrients provided by the dining facility menu were adequate for all vitamins and minerals analyzed (45). The iron density at lunch and dinner was below the guideline of 6.0 mg/1000 kcal; however, adequate iron was available for the entire day due to the large iron NDI at breakfast (Table M-3). Grains provided 54% of the daily mean iron, with breakfast grain products alone contributing 38%. Iron fortification of cereals and breads was responsible for the large amount of iron available at breakfast. Vitamin B₆, folate, pantothenic acid, biotin, magnesium, and zinc analyses were not performed since the food composition data for these nutrients were incomplete.

The mean NDIs of the field menu are presented in (Table M-3). The field menu was significantly deficient in calcium since dairy products were not served in the field. The average daily field menu provided 223 mg calcium/1000 kcal versus the guideline of 333 mg/1000 kcal. The average field lunch provided only 171 mg calcium/1000 kcal. This would be crucial if all meals were eaten in the field where dairy products were not served; however, the basic trainees generally ate one meal in the dining facility where they

Table M-3. Mean Nutrient Density Indices of the Study Menu^a.
(Unit per 1000 Calories).

	N ^b	PROTEIN (g)	CHOLESTEROL (mg)	SODIUM (mg)	IRON (mg)	CALCIUM (mg)
DINING FACILITY						
Breakfast	7	35	230	1507	10.3	524
Lunch	7	38	149	1814	5.1*	494
Dinner	7	35	146	1863	5.0*	511
Total For Day	7	36	174	1732	6.7	509
FIELD						
Breakfast	3	26*	430	1522	15.0	282*
Lunch	6	37	195	2270	7.1	171*
Dinner	3	30*	185	2377	7.6	243*
Total For Day ^d	2	32*	284	1952	7.3	223*
AR 40-25		33	-- ^c	1700	6.0	333

	N	VIT. A (mcg)	THIAMIN (mg)	VIT. B ₂ (mg)	NIACIN (mg)	VIT. B ₁₂ (mcg)	ASCORBIC ACID (mg)
DINING FACILITY							
Breakfast	7	319	1.0	1.2	11.4	2.0	59
Lunch	7	951	0.6	0.8	8.5	1.6	34
Dinner	7	1272	0.5	0.8	8.2	1.5	37
Total For Day	7	857	0.7	1.0	9.3	1.7	43
FIELD							
Breakfast	3	269*	1.2	1.1	11.0	1.4	94
Lunch	6	1484	0.7	0.7	10.3	0.9	56
Dinner	3	2143	0.7	0.7	9.3	0.8	64
Total For Day ^d	2	1316	0.9	0.8	10.4	1.1	71
AR 40-25		333	0.5	0.6	6.7		25

^aStudy menu obtained by averaging like food items in categories where only one serving would be expected.

^bN indicates the number of meals or days upon which the analyses were based.

^cAmerican Heart Association recommendation: <100mg cholesterol per 1000 kcal.

^dTotal For Day for the field menu is based on the two days for which data for three meals were available.

*Did not meet nutrient density guidelines specified in AR 40-25.

had access to dairy products. Although a nutrient density index for vitamin B₁₂ is not specified in AR 40-25, calculating an index from the MRDA yields a nutrient density guideline of 0.94 mcg/1000 kcal, if using the higher calorie allowance for males, or 1.25 mcg/1000 kcal based on the lower caloric requirements of women. The average field lunch and dinner menus did not approach this level, again because of the lack of dairy products. Regarding most of the other nutrients, the field menu was more nutrient dense. Fewer choices and fewer extra foods sent to the field were reasons for the higher nutrient density of the field menu. Cakes and other less nutrient dense foods which would have increased the total number of calories without increasing other nutrients proportionately were not served in the field.

The major food group of meats/entrees contributed the greatest percent of fat to the dining facility menu (Table M-4). Meats provided 24.4% of the available total fat calories, ranging from 20.8% to 27.8%. Breakfast meats alone provided 8.3 percent of the fat in the daily menu. The percent fat contribution of the meat/entree food group for the field menu increased to 43.1% (range 41.3 to 44.7 percent) because dairy products, fat-based salads, and desserts were not offered in the field, and therefore, the fat content of meat was a major contributor to total available energy. The next greatest fat source was peanut butter (legume food group), which provided almost 19% of the total available fat calories in the dining facility menu (Table M-5). Peanut butter was not sent to the field.

Table M-4. Mean Percent of Nutrients Supplied by the Major Food Groups (DINING FACILITY MENU).

	Kcal	Carbo- hydrate	Protein	Fat	Cholesterol	Sodium	Iron	Calcium
	← ————— % ————— →							
Dairy	21.2	21.2	33.3	15.8	13.5	13.6	4.2	67.7
Meat Dishes	15.2	2.9	31.2	24.4	71.6	19.5	18.5	6.5
Legumes	9.2	2.4	11.0	18.9	0.0	5.5	4.2	1.0
Grains	18.4	26.3	14.3	8.6	4.7	25.8	53.1	12.9
Fruits	7.2	14.6	1.7	0.5	0.0	0.2	3.2	2.7
Vegetables	6.5	8.8	4.7	4.8	1.5	7.1	8.8	4.7
Table fats	7.7	2.0	0.7	17.8	1.3	10.1	1.4	0.9
Condiments	1.4	17.2	2.5	7.4	7.0	2.8	4.2	2.2
Desserts	11.3	17.2	2.5	7.4	7.0	2.8	4.15	2.2
Beverages	1.9	3.8	0.0	0.0	0.0	0.4	0.6	0.5

Table M-4 (cont). Mean Percent of Nutrients Supplied by the Major Food Groups (DINING FACILITY MENU).

	Vitamin A	Thiamin	Riboflavin	Niacin	Vitamin B ₁₂	Ascorbic Acid
	<div> <div>←</div> <div>%</div> <div>→</div> </div>					
Dairy	9.6	12.2	41.5	2.6	48.5	4.4
Meat Dishes	7.2	19.9	16.6	24.9	35.2	7.8
Legumes	0.0	2.7	2.0	24.7	0.0	0.0
Grains	4.03	46.3	28.2	35.6	4.2	2.7
Fruits	4.1	6.8	4.1	3.5	0.0	56.1
Vegetables	65.6	8.7	4.4	8.1	0.9	23.1
Table fats	3.7	0.8	0.9	0.4	1.0	0.2
Condiments	1.4	0.6	0.5	0.6	0.0	2.8
Desserts	4.6	2.1	2.5	1.3	1.9	3.4
Beverages	0.0	0.0	0.3	0.1	0.0	0.4

Table M-5. Mean Percent of Nutrients Supplied by the Major Food Groups (FIELD MENU).

	Kcal	Carbo- hydrate	Protein	Fat	Cholesterol	Sodium	Iron	Calcium
	← ————— % ————— →							
Dairy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Meat Dishes	25.7	2.6	59.9	43.1	92.2	23.0	21.4	15.2
Legumes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grains	26.8	36.5	24.3	13.0	5.8	29.4	60.3	42.9
Fruits	12.9	25.6	3.9	1.0	0.0	0.2	4.0	11.9
Vegetables	8.5	12.7	9.8	3.4	0.1	10.9	10.8	19.2
Table fats	17.0	4.4	1.7	39.4	1.9	18.6	2.1	3.2
Condiments	0.1	0.2	0.2	tr*	0.0	17.8	0.2	1.1
Desserts	7.7	15.5	0.2	tr*	0.0	0.1	1.1	2.0
Beverages	1.3	2.6	0.0	0.0	0.0	0.1	tr	4.5

* trace amount of contribution

Table M-5 (cont). Mean Percent of Nutrients Supplied by the Major Food Groups (FIELD MENU).

	Vitamin A	Thiamin	Riboflavin	Niacin	Vitamin B ₁₂	Ascorbic Acid
	← ————— % ————— →					
Dairy	0.0	0.0	0.0	0.0	0.0	0.0
Meat Dishes	3.6	22.1	30.9	35.1	95.0	2.3
Legumes	0.0	0.0	0.0	0.0	0.0	0.0
Grains	2.1	54.8	46.7	45.9	0.1	0.2
Fruits	4.3	10.3	9.5	6.3	0.0	69.0
Vegetables	85.1	11.0	10.1	11.4	1.1	23.2
Table fats	4.8	1.6	2.2	1.0	3.8	0.7
Condiments	0.1	0.0	0.1	0.0	0.0	0.0
Desserts	tr	0.1	0.4	0.2	0.0	2.3
Beverages	0.0	0.0	0.0	0.0	0.0	2.3

Dairy products were another major source of fat in the dining facility menu (Table M-4). Almost 16% percent of fat calories were from the dairy group. In contrast to the Master Menu and Armed Forces Recipes, 2% low fat milk was the sole milk source in prepared recipes instead of nonfat dried milk. While this difference may have increased the total fat provided by the study menu, the overall effect is unknown. Together the dairy and meat/entree food groups provided at least 36% of the total fat calories in the dining facility menu in the form of animal fats.

The mean NDI for cholesterol was 174 mg/1000 kcal, which is 74% higher than the American Heart Association recommendation (Table M-3). The field menu provided almost 3 times the recommended level, with most of the cholesterol being consumed at breakfast. Breakfast meats provided 37% of the mean daily available cholesterol probably because eggs were included in the breakfast meat category.

Limitations of the nutrient data base precluded analysis of the fatty acid composition of the study menus. However, based upon the major sources of available dietary fat, an assumption may be made that the study menu provided more available saturated fatty acids than polyunsaturated fatty acids. This assumption was made since 40.2% of available dietary fat was provided by animal sources (Table M-4) and animal fats, generally, are higher in saturated fatty acids than plant sources.

Although the sodium content of the field menu was about 5000 mg less than the dining facility menu (Table M-1), the field menu was more sodium dense when expressed as mg/1000 kcal. The field menu averaged 1952 mg sodium/1000 kcal compared to 1731 mg/1000 kcal in the dining facility menu (Tables M-4 and

5). The Army guideline for maximum sodium intake is 1700 mg/1000 kcal. Since the foods served in the field were the same as those available in the dining facility and no extra salt was added to the food before service in the field, the sodium density was probably affected by the foods that were not served in the field. The low sodium, high calories foods such as cake, salads, etc. could have lowered the sodium density. The dining facility menu, as served, would have provided foods that would have met the MRDA limitations on sodium as long as no extra salt was added to the food.

Grains and meat dishes were the major contributors of sodium to the diet (Tables M-4 and M-5). Due to their sodium density, condiments provided 15 percent of the mean available menu sodium while providing only 1.4 percent of the available energy. Food items categorized as condiments included: catsup, mustard, pickles, steak sauce, tartar sauce, worcestershire sauce, and salt. One salt packet was included in the menu analysis for each meal. Each packet contained approximately one sixth of a teaspoon of salt, contributing a total of 1200 mg sodium to the daily menu.

A common misconception is that items on a salad bar are lower calorie or healthier alternatives to other foods. While this may be true if proper selections are made, many salad bar items are relatively high in calories, fat, and/or sodium. Foods such as eggs, cheese, peanut butter, and olives, which are high in cholesterol, sodium, and/or fat, are often selected over the lower calorie and lower sodium raw vegetables. Based on a selection of one portion of every lettuce salad item (Table M-6), a garden salad without dressing could total 354 kcal, 24 g fat (61 percent of calories) and 966 mg sodium. Adding a moderate serving of two tablespoons of a regular salad

Table M-6. Macronutrient and Sodium Content of Hypothetical Lettuce Salad.

INGREDIENT	PORTION	ENERGY (kcal)	CARBO- HYDRATE (g)	PROTEIN (g)	FAT (g)	SODIUM (mg)
Lettuce	1 cup	6	1	<1	0	4
Cucumber	3 slices	2	<1	0	0	<1
Carrots	1 TBSP	6	2	<1	<1	5
Mushrooms	1 TBSP	2	<1	<1	<1	30
Onion	1.5 slice	11	2	<1	<1	1
Tomato	2 wedges	5	1	<1	<1	2
Chow Mein						
Noodles	1 TBSP	39	5	1	2	80
Egg, chopped	1 TBSP	36	<1	3	3	32
Bacon bits	1 TBSP	75	0	4	6	208
Cheese	1.2 oz	144	<1	9	12	425
Olive, black	1 each	6	<1	<1	1	26
Olive, green	1 each	4	0	<1	<1	94
Pickle, dill	1 chunk	2	<1	<1	<1	193
Pickle, sweet	1 chip	15	4	<1	<1	71
Total		354	16	19	24	966
Regular Salad drsg	2 TBSP	162	6	<1	16	348
Total Salad		516	22	19	40	1314

dressing, a salad could contain 516 kcal, 40 g fat and 1314 mg sodium, with 70% of the calories coming from fat. On the average, other fat-based salads on the salad bar contained 37% of their calories from fat, ranging from 19% fat in the macaroni salad on day two to 60% of calories as fat in the coleslaw served on the same day. The fat-based salads contributed 118 kcal, 5 g fat and 271 mg sodium to the average daily menu. Therefore, salads can contribute to excess fat and sodium intakes. Information about the ingredients in salad

bars should be included in nutrition education programs, with emphasis on consuming the fresh vegetables and low calorie dressings. However, as discussed before, knowing that low calorie dressing can help control weight and lower fat intake and actually selecting the low calorie dressing are two different things. Developing and getting the customer to consume lower calorie, lower sodium, good tasting salads and dressings might present a challenge to food service managers.

Although the methods used to analyze the study menu were similar to methods used by the Army to analyze the Master Menu, the results are dissimilar (Table M-1), with the dining facility menu providing nearly twice the nutrients of the Master Menu. Differences in the nutrient data bases, recipe coding procedures and computer analysis programs make comparisons difficult. The Master Menu included gravy on only two meals, whereas the garrison dining facility served gravy at ten of the fourteen lunches and/or dinners. The Master Menu analysis did not include soft drinks. As previously discussed, 2% low fat milk was used in recipe preparation at the Ft. Jackson dining facility, whereas nonfat dry milk was specified in the Master Menu. The major discrepancy between the menus was in the salad items. All salad dressings on the Master Menu were low calorie, either Low Calorie Tomato Dressing or Zero Dressing, both prepared without oils or other fat sources. The nutrient analysis of the Master Menu was based on an average of two salad choices, whereas, the dining facility menu provided a garden salad in addition to one other salad from the salad bar. In most cases, at least one of the Master Menu salads was a relatively low calorie, low fat vegetable salad or fruited gelatin salad. The salad bar choices at Fort Jackson always included

fat-based salads. Additionally, the Master Menu analysis is an average of 30 menu days, whereas the study menu included only 7 days.

APPENDIX N - VARIABILITY IN OBSERVED RECIPES

If recipes were prepared exactly according to instructions, then a Recipe Specialist would not be needed, except to collect data on the type of ingredients. However, variations among cooks preparing the same recipes have been observed. Major differences in recipe preparation were noticed in the last three studies that have been conducted by USARIEM in garrison dining facilities, although these data have not been fully analyzed or previously reported. Recipes which were observed more than once during this study were compared on a nutrient per 100 gram basis. Table N-1 shows that there was a wide variation between recipes $[(\text{maximum} - \text{minimum}) / \text{maximum}] \times 100$ for caloric content. The variation in caloric values of sets of recipes ranged from a minimum of 0% for French Toast to a maximum of 88.7% for Brown Gravy. The variation between recipes was as large as 96.6% for sodium in Grits (Table N-2). Ten of the sixteen recipes had variations >50% for sodium. Although one of the recipes had a 100% variation in carbohydrate, the difference was less than 0.2 g (Table N-3), which is minimal in terms of total carbohydrate intake. In regard to carbohydrate, twelve of the sixteen recipes had variations <50%, which indicates that most cooks were careful in measuring carbohydrate ingredients. The protein variations were all less than 50% except for Brown Gravy with 80% variation but the difference between the minimum and maximum was only 1.2 g (Table N-4) and therefore protein sources in recipes were measured fairly consistently.

The recipes varied widely in the amount of fat per recipe, with the fat content of the Mashed Potato, Brown Gravy, and Rice recipes varying the most at 94.4%, 89.2%, and 86.4%, respectively (Table N-5). These recipes were prepared 6-8 times and the variations reflected the cooking styles of the

different cooks and the availability of ingredients. The type of fat used in preparing these recipes varied just as widely as the amount. Depending on the availability from the Troop Issue Support Agency, the following items were used interchangeably as the source of fat in many of the recipes: corn oil, margarine, and two different types of liquid frying shortening. The margarine had a soybean oil base and the liquid shortening was a soybean/cottonseed oil blend.

The cholesterol contents varied by 67.4% and 70.7% (Table N-6) for the macaroni and potato salads, respectively. These two salads varied so widely because of the variation in the amount of hard cooked eggs and salad dressing added to the recipes. The amount of eggs used in the recipe depended on the cook's use of eggs as a garnish and on the availability of eggs. Mashed potatoes showed a 100% variation, but that was due to one recipe having no cholesterol and the other having 2.2 mg cholesterol due to added milk. Most other recipes were very similar in cholesterol contents.

These variations between recipes would cause a major miscalculation in nutrient intakes if the Recipe Cards were used "as is" or if the second and third repetitions of the recipe preparation were not observed and changes recorded. In most instances the cooks preparing the different recipes were using the recipe cards. Variations were due to errors in converting recipe yields, availability of ingredients, differences in measurement technique, as well as how closely the recipe was followed. The differences indicate that monitoring recipe preparation is essential for accurate dietary data. This range of variability was not unique to this dining facility and was not indicative of poor management practices. Although never analyzed, recipe

variations in other garrison dining facilities were probably similar to those in the present study.

Table N-1. Mean Caloric Values and Variation for 100 gram Portions of Observed Recipes.

RECIPE	N	MEAN±SD (kcal)	MINIMUM (kcal)	MAXIMUM (kcal)	VARIATION ^a (%)
Beef Stew	2	112±21.9	97	127	23.6
Braised Pork Chops	2	359± 8.4	353	365	3.3
Brown Gravy	7	76±39.8	14	124	88.7
Carrot Raisin Sld	3	149±22.0	134	175	23.4
Coleslaw	4	87±31.7	55	126	56.3
Creamed Beef	5	146± 9.8	133	157	15.3
French Toast	2	266± 0.1	266	266	0.0
Grits	6	45±10.4	34	60	43.3
Macaroni Salad	6	134±17.9	117	165	29.1
Mashed Potatoes	8	108±34.1	66	184	64.1
Noodles	4	156±12.7	145	174	16.7
Oatmeal	2	51±11.1	43	59	27.1
Oven Brn Potatoes	2	126± 7.8	120	131	8.4
Potato Salad	7	124±12.9	112	143	21.7
Rice	6	112± 5.8	107	123	13.0
Roast Turkey	3	160± 3.0	157	163	3.7

^aVariation (%) = [(maximum - minimum)/maximum] x 100

Table N-2. Mean Values and Ranges for 100 gram Portions of Observed Recipes for the Nutrient SODIUM.

RECIPE	N	MEAN+SD (mg/100g)	MINIMUM (mg/100g)	MAXIMUM (mg/100g)	VARIATION ^a (%)
Beef Stew	2	277+ 11.7	268	285	6.0
Braised Pork Chops	2	135+ 34.0	111	159	30.2
Brown Gravy	7	310+191.0	114	619	81.6
Carrot Raisin Sld	3	162+ 18.6	146	182	19.8
Coleslaw	4	281+145.7	76	412	81.6
Creamed Beef	5	386+138.0	255	616	58.6
French Toast	2	512+ 1.4	511	513	0.4
Grits	6	45+ 33.9	3	87	96.6
Macaroni Salad	6	359+350.5	106	1041	89.8
Mashed Potatoes	8	249+157.2	32	468	93.2
Noodles	4	151+108.4	29	282	89.7
Oatmeal	2	68+ 84.3	8	127	93.7
Oven Brn Potatoes	2	372+ 98.5	302	442	31.7
Potato Salad	7	194+102.2	102	385	73.5
Rice	6	508+186.8	350	814	57.0
Roast Turkey	3	689+ 24.1	673	717	6.1

^aVariation (%) = [(maximum - minimum)/maximum] x 100

Table N-3. Mean Values and Ranges for 100 gram Portions of Observed Recipes for the Nutrient CARBOHYDRATE.

RECIPE	N	MEAN±SD (g/100g)	MINIMUM (g/100g)	MAXIMUM (g/100g)	VARIATION ^a (%)
Beef Stew	2	7.0±0.6	6.5	7.4	12.2
Braised Pork Chops	2	0.1±0.1	0.0	0.2	100.0
Brown Gravy	7	5.5±2.7	1.1	8.7	87.4
Carrot Raisin Sld	3	22.4±3.4	19.6	26.3	25.5
Coleslaw	4	10.6±3.9	6.8	14.0	51.4
Creamed Beef	5	10.6±2.8	7.3	14.0	47.9
French Toast	2	48.4±0.0	48.4	48.5	0.2
Grits	6	9.6±2.3	7.2	13.0	44.6
Macaroni Salad	6	21.2±2.3	18.9	25.5	25.9
Mashed Potatoes	8	20.4±5.0	14.4	31.7	54.6
Noodles	4	22.3±0.5	21.6	22.7	4.8
Oatmeal	2	8.9±1.9	7.5	10.2	26.5
Oven Brn Potatoes	2	19.5±1.0	18.7	20.2	7.4
Potato Salad	7	18.5±0.8	17.2	19.4	11.3
Rice	6	23.2±0.4	22.8	24.0	5.0
Roast Turkey	3	3.1±0.0	3.0	3.1	3.2

^aVariation (%) = [(maximum - minimum)/maximum] x 100

Table N-4. Mean Values and Ranges for 100 gram Portions of Observed Recipes for the Nutrient PROTEIN.

RECIPE	N	MEAN±SD (g/100g)	MINIMUM (g/100g)	MAXIMUM (g/100g)	VARIATION ^a (%)
Beef Stew	2	12.6±1.7	11.4	13.7	16.8
Braised Pork Chops	2	29.0±0.5	28.6	29.4	2.7
Brown Gravy	7	0.9±0.4	0.3	1.5	80.0
Carrot Raisin Sld	3	1.6±0.2	1.3	1.8	27.8
Coleslaw	4	1.2±0.1	1.1	1.4	21.4
Creamed Beef	5	9.2±0.9	8.0	10.1	20.8
French Toast	2	8.3±0.0	8.3	8.3	0.0
Grits	6	1.1±0.2	0.8	1.4	42.9
Macaroni Salad	6	3.6±0.4	3.3	4.5	26.7
Mashed Potatoes	8	2.4±0.4	1.7	3.1	45.2
Noodles	4	3.9±0.0	3.8	4.0	5.0
Oatmeal	2	1.7±0.4	1.5	2.0	25.0
Oven Brn Potatoes	2	1.8±0.2	1.6	1.9	15.8
Potato Salad	7	2.3±0.4	1.8	2.9	37.9
Rice	6	2.1±0.0	2.0	2.1	4.8
Roast Turkey	3	21.2±0.1	21.1	21.3	0.9

^aVariation (%) = [(maximum - minimum)/maximum] x 100

Table N-5. Mean Values and Ranges for 100 gram Portions of Observed Recipes for the Nutrient TOTAL FAT.

RECIPE	N	MEAN+SD (g/100g)	MINIMUM (g/100g)	MAXIMUM (g/100g)	VARIATION ^a (%)
Beef Stew	2	3.5+1.4	2.5	4.5	44.4
Braised Pork Chops	2	26.1+1.2	25.3	27.0	6.3
Brown Gravy	7	5.6+3.1	1.0	9.3	89.2
Carrot Raisin Sld	3	6.8+1.0	6.1	7.9	22.8
Coleslaw	4	4.9+2.2	3.0	8.0	62.5
Creamed Beef	5	7.4+0.4	6.8	8.0	15.0
French Toast	2	4.0+0.0	4.0	4.0	0.0
Grits	6	0.2+0.1	0.1	0.5	0.8
Macaroni Salad	6	3.8+1.3	2.0	5.5	63.6
Mashed Potatoes	8	2.1+1.8	0.3	5.4	94.4
Noodles	4	5.6+1.7	4.1	7.9	48.1
Oatmeal	2	1.0+0.2	0.8	1.2	33.3
Oven Brn Potatoes	2	4.8+0.4	4.6	5.1	9.8
Potato Salad	7	4.9+1.4	3.4	6.7	49.3
Rice	6	0.9+0.7	0.3	2.2	86.4
Roast Turkey	3	6.4+0.4	6.0	6.8	11.8

^aVariation (%) = [(maximum - minimum)/maximum] x 100

Table N-6. Mean Values and Ranges for 100 gram Portions of Observed Recipes for the Nutrient CHOLESTEROL.

RECIPE	N	MEAN+SD (mg/100g)	MINIMUM (mg/100g)	MAXIMUM (mg/100g)	VARIATION ^a (%)
Beef Stew	2	35.0+ 4.6	31.7	38.2	17.0
Braised Pork Chops	2	105.4+ 2.0	103.9	106.8	2.7
Brown Gravy	7	0.0	0.0	0.0	0.0
Carrot Raisin Sld	3	6.2+ 1.1	5.1	7.4	31.1
Coleslaw	4	4.1+ 1.5	2.8	6.1	54.1
Creamed Beef	5	19.8+ 2.6	16.5	23.5	29.8
French Toast	2	5.4+ 0.0	5.4	5.4	0.0
Grits	6	0.0	0.0	0.0	0.0
Macaroni Salad	6	40.8+15.0	18.9	58.0	67.4
Mashed Potatoes	8	1.0+ 0.7	0.0	2.2	100.0
Noodles	4	29.6+ 0.6	28.8	30.2	4.6
Oatmeal	2	0.0	0.0	0.0	0.0
Oven Brn Potatoes	2	0.0	0.0	0.0	0.0
Potato Salad	7	44.2+17.7	22.6	77.1	70.7
Rice	6	0.0	0.0	0.0	0.0
Roast Turkey	3	52.6+ 0.2	52.4	52.9	0.9

^aVariation (%) = [(maximum - minimum)/maximum] x 100

APPENDIX O - COMPARISON OF DIETARY INTAKES
IN THE FIELD AND THE DINING FACILITY

Each company commander was given the option of feeding soldiers in the field if the time required to transport trainees back to the dining facility would adversely affect the training schedule. A total of 1379 (81%) of the meals were eaten in the dining facility and 263 (16%) in the field (Table 30). The proportion of meals eaten in the dining facility was important when analyzing basic trainee food consumption, since nutrient intakes differed greatly depending upon the feeding location.

This study was conducted at the beginning of the training cycle. As the trainees progress through the training cycle, more time is spent at the field training sites. Although the feeding and training schedules were not available for this later time period, the battalion commander indicated that a greater number of meals are served at the end of the training cycle. The overall effect of eating more meals in the field on dietary intakes cannot be estimated, but should be considered when attempting to extend the results of this study to the entire basic training cycle. The lower caloric and calcium content of the field menu could result in inadequate intakes if eaten for extended periods.

Comparisons of dietary intakes in the dining facility and field were possible for 14 meals. Overall energy intakes were lower for the males and females eating in the field than in the dining facility (Table O-1). At the dinner meals of days 6 and 7 the energy intakes for the field meals were larger than for the dining facility, but this could be explained by the service of higher calorie meats in the field on those days. The service of high fat corned beef in the field vs. the lower calorie spanish beef and steak

Table O-1. Comparison of Mean Energy (kcal) Intake by Location.

GENDER	MEAL	DAY	LOCATION	N	KCAL (Mean±SD)	
Male	B	2	Dining Facility	32	1072±289	
			Field	9	847±356	
Male	B	6	Dining Facility	30	1177±401	#
			Field	10	752±182	
Male	B	7	Dining Facility	30	1141±335	
			Field	9	1137±157	
Male	L	2	Dining Facility	21	1105±381	#
			Field	19	879±224	
Female	L	3	Dining Facility	24	1007±309	#
			Field	16	809±193	
Male	L	5	Dining Facility	27	962±318	#
			Field	10	711±244	
Female	L	5	Dining Facility	9	671±135	
			Field	28	636±128	
Male	L	6	Dining Facility	12	1190±293	
			Field	19	1043±190	
Female	L	6	Dining Facility	17	1082±310	#
			Field	20	816±104	
Male	L	7	Dining Facility	21	1095±251	#
			Field	19	890±137	
Female	L	7	Dining Facility	6	1069±133	#
			Field	31	856±171	
Male	D	4	Dining Facility	31	1012±272	
			Field	9	923±213	
Male	D	6	Dining Facility	30	1083±334	
			Field	9	1114±208	
Female	D	7	Dining Facility	22	879±220	
			Field	17	934±215	

SD=Standard Deviation

#=Significant at $p<0.05$ level

in the dining facility may have accounted for the difference in calories on day 6.

The same reason probably applies to day 7 when roast turkey was served in the dining facility and the higher calorie beef with noodles in the field.

Statistical analysis by independent t-test determined that energy intake was significantly different for seven of the fourteen meals available for comparison (Table 0-1).

Unfortunately, field intakes for the total day could not be analyzed since all subjects ate at least one meal per day in the dining facility. Analysis of the individual meal intakes indicated that the %FAT and %PRO were less in the field compared to the dining facility, with carbohydrate calories contributing more to energy intake (Table 0-2). This difference was probably related to the lack of dairy products and the use of a high carbohydrate Kool-Aid type drink as the major beverage in the field. Although the distribution of calories recommended in the MRDA is usually intended for the entire day, a comparison of meals to the MRDA showed that the %CHO for the separate dining facility meals were generally lower than the recommended 50-55% while the field meals were within the range. In general the %FAT was lower than the 35% recommended in the MRDA for the breakfast and lunch meals.

Table O-2. Percent Contributions of Protein, Fat, and Carbohydrate to the Mean Energy Intake of Meals Eaten in the Dining Facility and Field.

GENDER	MEAL	LOCATION	% OF ENERGY INTAKE (\pm SD)		
			PROTEIN	FAT	CARBOHYDRATE
Male	B	Dining Facility	13 \pm 2	30 \pm 8	59 \pm 10
		Field	11 \pm 2	29 \pm 7	61 \pm 10
Male	L	Dining Facility	18 \pm 4	35 \pm 11	48 \pm 10
		Field	17 \pm 4	33 \pm 9	51 \pm 9
Female	L	Dining Facility	18 \pm 5	34 \pm 11	49 \pm 11
		Field	17 \pm 5	32 \pm 11	52 \pm 11
Male	D	Dining Facility	17 \pm 4	36 \pm 10	48 \pm 11
		Field	14 \pm 2	38 \pm 9	48 \pm 9
Female	D	Dining Facility	18 \pm 5	39 \pm 10	45 \pm 11
		Field	13 \pm 2	33 \pm 3	54 \pm 4

APPENDIX P - MRE CONSUMPTION

The MRE operational rations (version VI) were served during two lunch meals to a total of 19 male basic trainees. Mean nutrient intakes provided by the rations are presented in Table P-1. Company commanders were given the option of serving MREs, however, they were not served very often during basic training. A Kool-Aid type beverage was served with these meals. The analysis provided in Table P-1 provides MRE intake information with and without the Kool-Aid type beverage. This drink is not part of version VI of the MREs, but will appear in newer versions and therefore the effects of the drink on nutrient intake was studied. The consumption of the drink in the field increased energy, carbohydrate, ascorbic acid, sodium, calcium, and phosphorus intakes. Previous studies have reported on the lower consumption of MREs compared to A- and T-ration meals (70) and this same phenomenon was expected

Table P-1. Mean Nutrient Intakes for MRE Meals.

NUTRIENT	NUTRIENT INTAKE (MEAN)		
	MRE	MRE+KOOL-AID TYPE DRINK	
Energy (kcal)	1052	± 270	1117
Protein (g)	44	± 15	44
Fat (g)	50	± 12	50
Carbohydrate (g)	105	± 33	122
Cholesterol (mg)	81	± 37	81
Vitamin A (mcg RE)	536	± 273	536
Thiamin (mg)	2.06	± 0.74	2.06
Riboflavin (mg)	0.91	± 0.17	0.91
Niacin (mg NE)	9.88	± 3.65	9.88
Ascorbic Acid (mg)	42	± 24	50
Sodium (mg)	2084	± 666	2091
Potassium (mg)	958	± 398	958
Iron (mg)	7	± 3	7
Calcium (mg)	312	± 101	354
Phosphorus (mg)	576	± 229	664

to lower the caloric intake of the basic trainees. However, this was not the case. The mean energy intake from MREs was comparable to the dining facility intake (Tables O-1 and P-1) and more than the basic trainees normally ate in the field. This high consumption of MREs (87% of available calories) is very different from a past study in which soldiers ate only 29 to 58% of the available MRE calories (70). One reason may have been due to the novelty of eating MREs and consumption may decrease in the future.

APPENDIX Q - SELECTION RATES OF FOODS

SELECTION RATES FOR ALL FOODS OFFERED
ON THE DINING FACILITY AND FIELD MENUS

Abbreviations:

MEAL = Meal times
 Brek = Breakfast
 Lunc = Lunch
 Dinn = Dinner
LOC = Location of meal service
 FAC = Dining Facility
 FLD = Field
GROUP = Major Food Group
 None = does not fit into a food group
 Dairy = Dairy/Dairy Products
 Meat = Meat and entrees
 Combo = Combination dishes such as beef/vegetables or beef/grains;
 combined with meat data in technical report
 Grain = Grain based foods i.e., pancakes, cereal, french toast, etc.
 Legum = Legumes - only peanut butter is in this group
 Fruit = Fruits and juices
 Desrt = Desserts and sweets
 Fats = Table fats
 Condi = Condiments such as sugar and salt
 Bever = Beverages
 Veget = Vegetables
 Chips = Chips and crackers
CODE = three digit code for different foods
FOOD CODE = Names of different foods
NUM = Frequency count for number of times the item was selected
MEAN = Mean weight in grams of a normal portion size of the food.
MEDI = Median weight in grams of a normal portion size of the food.

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
MALE	DAY1	BREK N=41	FAC	NONE	1	WATER	7	304.29	330.00
					37	SWEET AND LO	1	2.00	2.00
					40	MILK-LOWFAT 2%	17	235.73	183.00
				DAIRY	41	MILK 2% CHOC	5	338.04	344.00
					42	MILK-SKIM	4	120.00	105.00
					44	YOGURT, W FRUIT YUM YO	1	227.00	227.00
					96	CHEESE-COTTAGE	1	52.50	52.00
					8	EGG, HARD, CHOPPED	5	80.00	100.00
				MEAT	10	EGG-SCRAMBLED	33	84.07	86.00
					11	BACON-COOKED	20	19.98	17.00
					12	SAUSAGE PATTY	12	50.57	53.00
					310	BOLOGNA	4	36.25	29.00
					13	GRITS	12	168.94	177.50
				GRAIN	14	OATMEAL	6	167.63	181.50
					19	CEREAL-CORN FLAKES KELLOGGS	8	19.97	21.00
					23	CEREAL-RICE KRISPIES	10	19.40	17.00
					30	FRENCH TOAST	15	88.50	90.00
					31	PANCAKE	20	98.58	93.00
					32	TOAST	15	48.53	56.00
					34	TOAST-MIX GRAIN WHEAT	10	32.20	46.00
					45	BREAD-WHITE	2	58.00	58.00
				LEGUM FRUIT	49	PEANUT BUTTER	5	70.68	70.00
					55	ORANGE JUICE	35	376.31	342.00
					62	APPLE W SKIN	3	123.20	132.00
					63	BANANA MINUS SKIN	17	105.00	119.00
					65	ORANGE MINUS SKIN	1	225.00	225.00
					66	PEACH-FRESH-13%	4	95.55	98.00
					67	PEAR-FRESH-9%	4	168.50	171.00
					250	APPLESAUCE	1	84.00	84.00
				DESRT	36	MAPLE SYRUP-ARTIFICIAL	30	61.20	60.00
					71	JAM	8	30.88	26.00
					73	HONEY	2	18.00	18.00
					74	SUGAR	13	4.77	4.00
					83	MARGARINE, SOY	20	8.86	10.00
				FATS COND NONE	93	SALT	2	1.50	1.50
					1	WATER	1	330.00	330.00
					37	SWEET AND LO	1	1.00	1.00
				DAIRY	40	MILK-LOWFAT 2%	19	217.51	244.00
					41	MILK 2% CHOC	5	253.53	187.00
					42	MILK-SKIM	1	105.00	165.00
					44	YOGURT, W FRUIT YUM YO	4	544.80	181.50
					96	CHEESE-COTTAGE	1	75.00	75.00
				MEAT	8	EGG, HARD, CHOPPED	6	59.33	50.00
					10	EGG-SCRAMBLED	12	79.00	88.50
					11	BACON-COOKED	22	23.53	25.00
					12	SAUSAGE PATTY	7	50.35	53.00
					315	EGG WHITE NO YOLK	1	31.00	31.00
FEMALE	DAY1	BREK N=40	FAC	NONE	1	WATER	7	304.29	330.00
					37	SWEET AND LO	1	2.00	2.00
					40	MILK-LOWFAT 2%	17	235.73	183.00
					41	MILK 2% CHOC	5	338.04	344.00
					42	MILK-SKIM	4	120.00	105.00
					44	YOGURT, W FRUIT YUM YO	1	227.00	227.00
					96	CHEESE-COTTAGE	1	52.50	52.00
					8	EGG, HARD, CHOPPED	5	80.00	100.00
					10	EGG-SCRAMBLED	33	84.07	86.00
					11	BACON-COOKED	20	19.98	17.00

Sex	Date	Meal	LOC	GRDUP	CODE	Food Code	NUM	MEAN	MEDI
MALE				GRAIN	13	GRITS	5	198.46	188.00
					14	OATMEAL	4	222.02	224.50
					19	CEREAL-CORN FLAKES KELLOGGS	15	15.79	20.00
					23	CEREAL-RICE KRISPIES	7	16.27	17.00
					30	FRENCH TOAST	22	89.30	96.00
					31	PANCAKE	7	85.69	93.00
					33	TOAST	9	43.40	58.00
					34	TOAST-MIX GRAIN WHEAT	8	22.28	23.00
					47	BREAD-MIX GRAIN	2	42.00	42.00
				LEGUM	49	PEANUT BUTTER	8	43.00	35.00
				FRUIT	55	ORANGE JUICE	32	233.74	217.00
					57	PEACH DICED CND	1	34.50	34.00
					62	APPLE W SKIN	5	75.68	92.00
					63	BANANA MINUS SKIN	22	107.37	119.00
					65	ORANGE MINUS SKIN	1	112.50	112.00
					66	PEACH-FRESH-13%	6	84.28	98.00
					67	PEAR-FRESH-9%	1	180.00	180.00
					258	APPLESAUCE	1	92.40	92.00
				DESRT	38	MAPLE SYRUP-ARTIFICIAL	27	52.42	60.00
					71	JAM	5	13.00	13.00
					72	JELLY	1	28.40	28.00
					73	HONEY	4	13.20	12.00
					74	SUGAR	14	4.00	4.00
				BEVER	75	COFFEE BREWED	3	295.00	270.00
				FATS	83	MARGARINE, SOY	15	7.98	10.00
				COND	93	SALT	4	.63	1.00
				NONE	1	WATER	3	245.00	360.00
				DAIRY	40	MILK-LW/FAT 2%	9	427.00	335.00
					41	MILK 2% CHOC	4	492.97	500.50
					97	CHEDDAR CHEESE	15	63.09	50.00
				MEAT	7	EGG, HARD, CHOPPED	8	20.99	23.00
					120	BRAISED PORK CHOPS	23	92.10	89.00
				COMBO	144	BEEF STEW	20	329.58	304.00
				GRAIN	45	BREAD-WHITE	20	57.56	58.00
					47	BREAD-MIX GRAIN	18	42.30	48.00
					150	RICE PILAF	1	70.00	70.00
					151	RICE	28	170.64	129.00
					155	MACARONI SALAD	8	80.00	79.00
					195	CORN, WK PLAIN	18	80.67	85.50
				VEGET	197	CARROT RAISIN SALAD	2	274.52	274.50
					228	PEAS W MUSHROOMS	14	61.96	70.00
					239	CUCUMBER-RAW	3	20.00	24.00
					241	LETTUCE ICEBERG RAW	9	51.84	55.00
					249	TOMATO-RAW	8	30.88	26.00
					308	COLESLAW	2	126.14	124.50
					309	POTATO SALAD	1	140.80	140.00
					311	WASHED POTATO	6	131.32	123.00
				FRUIT	62	APPLE W SKIN	1	176.00	176.00
					63	BANANA MINUS SKIN	2	119.00	119.00
					65	ORANGE MINUS SKIN	2	258.75	258.50
					67	PEAR-FRESH-9%	4	132.75	160.50

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NJM	MEAN	MEDI
FEMALE	DAY1	LUNC N=2	FAC	DESSERT	251	JELLO W FRUIT COCKTAIL	4	111.25	97.50
					253	JELLO W PEACHES	3	80.00	80.00
					299	CAKE, BANANA	6	50.35	57.00
					313	CAKE, COCONUT	3	49.50	49.00
					314	CAKE, GERMAN CHOCOLATE	11	60.37	63.00
					318	CAKE, SPONGE W O FROSTING	5	39.77	41.00
				BEVER	80	KOOLAID	29	348.34	330.00
					260	TEA BREWED	1	300.00	300.00
				FATS	83	MARGARINE, SOY	19	9.51	10.00
					273	SALAD DRESSING-ITALIAN	4	39.00	30.00
					312	BROWN GRAVY	16	57.85	52.00
				CONDI	93	SALT	5	.80	1.00
					295	PICKLE-DILL	2	12.00	12.00
				CHIPS	290	CHOW MEIN NOODLES	4	9.20	8.50
					292	CRACKERS, SALTINES	8	17.19	22.00
				MEAT	120	BRAISED PORK CHOPS	1	44.50	44.00
				GRAIN	45	BREAD-WHITE	1	29.00	29.00
					47	BREAD-MIX GRAIN	1	22.80	22.00
					160	RICE PILAF	2	70.00	70.00
				VEGET	195	CORN, WK PLAIN	1	79.20	79.00
					226	PEAS W MUSHROOMS	1	85.00	85.00
				FRUIT	63	BANANA MINUS SKIN	1	29.76	29.00
				DESSERT	253	JELLO W PEACHES	1	60.00	60.00
					314	CAKE, GERMAN CHOCOLATE	2	53.00	53.00
FEMALE	DAY1	LUNC N=36	FLD	BEVER	80	KOOLAID	1	240.00	240.00
				FATS	83	MARGARINE, SOY	1	6.00	6.00
					312	BROWN GRAVY	1	52.00	52.00
				NONE	1	WATER	2	300.00	300.00
				MEAT	120	BRAISED PORK CHOPS	14	89.32	89.00
				COMBO	144	BEEF STEW	23	183.65	177.00
				GRAIN	45	BREAD-WHITE	8	54.01	58.00
					47	BREAD-MIX GRAIN	20	37.98	48.00
					161	RICE	21	121.09	118.00
				VEGET	195	CORN, WK PLAIN	28	76.00	88.00
					226	PEAS W MUSHROOMS	8	79.69	85.00
					241	LETTUCE ICEBERG RAW	23	35.76	45.00
					249	TOMATO-RAW	9	15.89	13.00
					311	MASHED POTATO	16	75.88	72.00
				FRUIT	62	APPLE W SKIN	19	154.23	176.00
					63	BANANA MINUS SKIN	7	107.10	119.00
					65	ORANGE MINUS SKIN	4	213.75	225.00
					67	PEAR-FRESH-8X	4	99.00	103.50
					80	KOOLAID	30	357.00	315.00
				BEVER	83	MARGARINE, SOY	10	10.92	10.00
				FATS	273	SALAD DRESSING-ITALIAN	12	15.00	12.00
					312	BROWN GRAVY	16	50.54	52.00
				CONDI	93	SALT	6	2.00	1.50
MALE	DAY1	LUNC N=1	OTH		40	MILK-LOWFAT 2%	1	488.00	488.00
					434	FRANKFURTER	1	67.00	67.00
				MEAT	435	HAMBURGER HOTDOG RLL	1	40.00	40.00
				GRAIN	436	CHEESECAKE SARA LEE	1	89.00	89.00
				DESSERT					

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
MALE	DAY1	DINN N=41	FAC	COND1	85	CATSUP	1	9.00	9.00
					86	MUSTARD-YELLOW	1	5.00	5.00
					1	WATER	3	234.38	315.00
					40	MILK-LOWFAT 2%	8	447.33	335.00
					41	MILK 2% CHOC	7	525.39	594.00
					42	MILK-SKIM	2	240.00	240.00
					44	YOGURT, W FRUIT YUM YO	2	170.25	170.00
					97	CHEEDAR CHEESE	17	60.69	49.00
					7	EGG, HARD, CHOPPED	8	20.84	23.00
					120	BRAISED PORK CHOPS	7	69.64	89.00
					305	FR FR FISH PORTION	25	105.02	109.00
					321	BAKED GLAZED HAM	11	116.57	116.00
					45	BREAD-WHITE	21	52.34	58.00
					47	BREAD-MIX GRAIN	19	42.57	48.00
					185	MACARONI SALAD	6	65.60	67.00
					317	FRIED RICE	22	105.11	90.00
					186	POTATO SALAD	4	134.40	128.00
					197	CARROT RAISIN SALAD	3	69.78	67.00
					216	LYONNAISE WAX BEANS	4	63.60	95.00
					221	CAULIFLOWER	1	56.00	56.00
					226	PEAS W MUSHROOMS	12	60.56	68.00
					230	COLESLAW, AVE RX	5	64.00	67.00
					239	CUCUMBER-RAW	5	16.80	18.00
					241	LETTUCE ICEBERG RAW	13	50.58	50.00
					316	TOMATO-RAW	10	27.30	26.00
					249	FRENCH FRIES	14	68.40	72.00
					319	LYONNAISE WAX BEAN NO SALT	4	75.52	71.00
					320	CAULIFLOWER	2	84.00	84.00
				FRUIT	62	APPLE W SKIN	1	123.20	123.00
					63	BANANA MINUS SKIN	3	59.17	107.00
					65	ORANGE MINUS SKIN	2	225.00	225.00
					66	PEACH-FRESH-13%	1	107.80	107.00
					67	PEAR-FRESH-9%	2	180.00	180.00
				DESSERT	251	JELLO W FRUIT COCKTAIL	2	110.00	110.00
					302	JELLO W PINEAPPLE	3	101.67	100.00
					80	KOOLAID	34	330.88	330.00
				BEVER	260	TEA BREWED	1	240.00	240.00
					83	MARGARINE, SOY	15	10.33	10.00
					273	SALAD DRESSING-ITALIAN	9	32.00	24.00
				FATS	277	SALAD DRESSING-THOUSAND ISLAND	1	20.00	20.00
					86	CATSUP	8	22.50	18.00
					88	MUSTARD-YELLOW	3	10.00	10.00
				COND1	89	PICKLE SWEET	4	32.50	30.00
					93	SALT	4	2.00	2.00
					289	TARTAR SAUCE	13	21.54	20.00
				CHIPS	295	PICKLE-DILL	2	4.50	4.50
					290	CHOW MEIN NOODLES	6	7.00	8.00
					292	CRACKERS, SALTINES	8	21.63	22.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
FEMALE	DAY1	DINN N=40	FAC	NONE DAIRY	1	WATER	3	185.00	150.00
					40	MILK-LOWFAT 2%	5	323.30	326.00
					41	MILK 2% CHOC	3	354.73	344.00
					42	MILK-SKIM	1	246.00	240.00
					97	CHEDDAR CHEESE	10	42.14	28.00
				MEAT	7	EGG, HARD, CHOPPED	5	22.77	23.00
					120	BRAISED PORK CHOPS	4	87.89	89.00
					305	FR FR FISH PORTION	23	103.69	103.00
					321	BAKED GLAZED HAM	12	75.71	71.00
				GRAIN	45	BREAD-WHITE	8	53.17	58.00
					47	BREAD-MIX GRAIN	27	37.07	48.00
					155	MACARONI SALAD	4	46.80	48.00
					317	FRIED RICE	24	77.69	82.00
				VEGET	185	POTATO SALAD	5	111.36	102.00
					197	CARROT RAISIN SALAD	2	79.00	78.00
					210	LYONNAISE WAX BEANS	1	74.20	74.00
					228	PEAS W MUSHROOMS	4	59.44	61.00
					230	COLESLAW, AVE RX	6	47.47	47.50
					239	CUCUMBER-RAW	3	20.00	18.00
					241	LETTUCE ICEBERG RAW	10	42.75	43.50
					243	ONION WHITE RAW	1	66.00	66.00
					249	TOMATO-RAW	6	39.33	26.00
					316	FRENCH FRIES	13	81.38	64.00
					319	LYONNAISE WAX BEAN NO SALT	7	69.88	73.50
				FRUIT	320	CAULIFLOWER	13	59.38	72.00
					62	APPLE W SKIN	2	88.00	88.00
					63	BANANA MINUS SKIN	1	119.00	119.00
					65	ORANGE MINUS SKIN	3	160.00	226.00
					66	PEACH-FRESH-13%	2	24.50	24.00
					67	PEAR-FRESH-9%	7	115.71	144.00
					296	NECTARINE	4	161.00	161.00
				DESRT	74	SUGAR	2	2.50	2.50
					251	JELLO W FRUIT COCKTAIL	3	100.00	110.00
					253	JELLO W PEACHES	1	95.00	95.00
					302	JELLO W PINEAPPLE	2	85.00	85.00
				BEVER	75	COFFEE BREWED	1	458.66	458.00
					80	KOOLAID	23	249.78	249.00
					260	TEA BREWED	4	150.00	249.00
					273	MARGARINE, SOY	18	8.00	10.00
				FATS	83	SALAD DRESSING-ITALIAN	7	21.26	18.00
					85	CATSUP	11	24.71	22.50
					88	MUSTARD-YELLOW	1	10.00	10.00
					89	PICKLE SWEET	3	30.00	30.00
				CONDI	93	SALT	5	.80	1.00
					289	TARTAR SAUCE	4	22.50	25.00
					290	CHOW MEIN NOODLES	5	6.72	7.00
					292	CRACKERS, SALTINES	4	13.75	11.00
				CHIPS	1	WATER	2	176.25	176.00
					40	MILK-LOWFAT 2%	13	301.48	305.00
					41	MILK 2% CHOC	4	344.30	344.00
					42	MILK-SKIM	1	240.00	240.00
					44	YOGURT, W FRUIT YUM Y0	1	227.00	227.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MED
FEMALE	DAY2	BREK N=48	FAC	MEAT	8	EGG, HARD, CHOPPED	2	188.85	188.85
					10	EGG-SCRAMBLED	24	86.76	86.76
					11	BACON-COOKED	24	22.70	17.00
					12	SAUSAGE PATTY	2	39.75	39.56
					310	BOLOGNA	5	47.56	58.00
				GRAIN	14	OATMEAL	4	187.25	214.00
					16	RAISIN BRAN KELLOG	8	39.38	35.00
					19	CEREAL-CORN FLAKES KELLOGGS	2	31.95	31.50
					23	CEREAL-RICE KRISPIES	1	17.80	17.00
					31	PANCAKE	11	95.54	93.00
					32	WAFFLE, PLAIN, COMMERCIAL	17	67.76	72.00
					33	TOAST	11	42.00	58.00
					34	TOAST-MIX GRAIN WHEAT	4	20.13	23.00
					45	BREAD-WHITE	6	48.33	43.50
				LEGUM VEGET FRUIT	47	BREAD-MIX GRAIN	6	44.00	48.00
					437	QUICK GRITS	10	210.79	214.00
					49	PEANUT BUTTER	4	58.40	64.00
					35	HASH BROWN	8	56.57	73.00
					55	ORANGE JUICE	23	305.59	311.00
					62	APPLE W SKIN	2	114.40	114.00
					63	BANANA MINUS SKIN	14	115.60	119.00
					65	ORANGE MINUS SKIN	1	225.00	225.00
					68	PEACH-FRESH-13%	4	134.75	98.00
					67	PEAR-FRESH-8%	2	180.00	180.00
			DESRT		69	GRAPE JUICE	3	320.00	330.00
					38	MAPLE SYRUP-ARTIFICIAL	25	60.00	60.00
					71	JAM	4	22.75	13.00
					72	JELLY	3	23.67	28.00
					73	HONEY	2	12.60	24.00
					74	SUGAR	5	5.60	6.00
				83	MARGARINE, SOY	12	12.92	10.00	
				92	TABASCO SAUCE	1	2.00	2.00	
				93	SALT	2	1.00	1.00	
				322	CATSUP	1	18.00	18.00	
			DAIRY	40	MILK-LOWFAT 2%	18	217.74	244.00	
				41	MILK 2% CHOC	4	328.65	359.00	
				42	MILK-SKIM	1	150.00	150.00	
				44	YOGURT, W FRUIT YUM YO	4	136.20	135.50	
				96	CHEESE-COTTAGE	1	45.00	45.00	
				MEAT	8	EGG, HARD, CHOPPED	2	100.00	100.00
					10	EGG-SCRAMBLED	17	74.54	75.00
					11	BACON-COOKED	28	21.35	22.00
					310	BOLOGNA	1	58.00	58.00
					16	RAISIN BRAN KELLOG	12	31.21	35.00
			GRAIN	19	CEREAL-CORN FLAKES KELLOGGS	7	19.17	21.00	
				23	CEREAL-RICE KRISPIES	3	23.08	17.00	
				31	PANCAKE	14	73.46	83.00	
				32	WAFFLE, PLAIN, COMMERCIAL	13	64.25	72.00	
				33	TOAST	5	32.48	28.00	
				34	TOAST-MIX GRAIN WHEAT	10	34.38	33.50	
				45	BREAD-WHITE	2	43.50	43.50	
				47	BREAD-MIX GRAIN	5	30.00	48.00	

262

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
MALE	DAY2	BREK N=9	FLD	MEAT	437	QUICK GRITS	4	130.54	171.00
					49	PEANUT BUTTER	9	38.01	28.00
					35	HASH BROWN	9	58.40	73.00
					55	ORANGE JUICE	20	211.48	217.00
					62	APPLE W SKIN	2	70.40	70.00
					63	BANANA MINUS SKIN	23	113.05	119.00
					66	PEACH-FRESH-13%	5	58.80	49.00
					67	PEAR-FRESH-9%	2	171.00	171.00
					69	GRAPE JUICE	14	267.86	300.00
					250	APPLESAUCE	3	84.00	88.00
					298	NECTARINE	1	161.00	161.00
					36	MAPLE SYRUP-ARTIFICIAL	24	49.10	54.00
				DESSERT	71	JAM	1	28.00	26.00
					72	JELLY	1	14.20	14.00
					73	HONEY	4	11.25	12.00
					74	SUGAR	7	3.14	4.00
					75	COFFEE BREWED	2	300.00	300.00
					83	MARGARINE, SOY	16	9.22	10.00
					93	SALT	6	1.42	1.00
					322	CATSUP	4	28.57	30.50
					8	EGG, HARD, CHOPPED	1	50.00	50.00
					10	EGG-SCRAMBLED	7	76.11	76.00
					11	BACON-COOKED	4	11.90	10.50
					12	SAUSAGE PATTY	3	47.70	53.00
					310	BOLOGNA	1	48.40	48.00
				GRAIN	14	OATMEAL	1	214.00	214.00
					32	WAFFLE, PLAIN, COMMERCIAL	6	69.60	72.00
					45	BREAD-WHITE	8	43.50	43.50
					47	BREAD-MIX GRAIN	1	48.00	48.00
					437	QUICK GRITS	5	182.84	214.00
					55	ORANGE JUICE	8	295.45	342.00
				FRUIT	62	APPLE W SKIN	2	176.00	176.00
					63	BANANA MINUS SKIN	3	107.10	119.00
					65	ORANGE MINUS SKIN	1	225.00	225.00
					66	PEACH-FRESH-13%	2	98.00	98.00
					67	PEAR-FRESH-9%	1	180.00	180.00
					36	MAPLE SYRUP-ARTIFICIAL	6	60.00	60.00
				DESSERT	71	JAM	3	43.33	39.00
					74	SUGAR	1	6.00	6.00
					83	MARGARINE, SOY	1	10.00	10.00
					93	SALT	2	2.00	2.00
					1	WATER	1	330.00	330.00
					40	MILK-LOWFAT 2%	1	671.00	671.00
					41	MILK 2% CHOC	1	187.80	187.00
					98	CHEDDAR CHEESE	9	44.50	30.00
					327	COTTAGE CHEESE W PINEAPPLE	2	106.00	106.00
				MEAT	323	SWISS STEAK	15	100.60	103.00
					324	ROAST TURKEY	6	143.22	154.00
					45	BREAD-WHITE	10	52.78	58.00
				GRAIN	47	BREAD-MIX GRAIN	9	42.67	48.00
					158	MACARONI SALAD	3	51.20	48.00
					163	NOODLES	14	143.79	126.50

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
FEMALE	DAY2	LUNC N=39	FAC	NONE DAIRY	177	RISSOLE POTATOES	2	138.00	138.00
					186	POTATO SALAD	1	153.00	153.00
					197	CARROT RAISIN SALAD	2	258.75	258.50
					214	HERBED GREEN BEANS	9	87.75	81.00
					225	MIXED VEGETABLES	5	72.00	110.00
					231	COLESLAW	3	48.00	48.00
					239	CUCUMBER-RAW	3	12.00	12.00
					241	LETTUCE ICEBERG RAW	8	56.83	55.00
					249	TOMATO-RAW	6	34.67	26.00
					332	WASHED POTATOES	3	103.00	103.00
				FRUIT	62	APPLE W SKIN	2	114.40	114.00
					65	ORANGE W/INUS SKIN	1	8.00	8.00
					66	PEACH-FRESH-13%	3	107.80	98.00
				DESRT	67	PEAR-FRESH-9%	3	195.00	180.00
					69	GRAPE JUICE	2	456.00	456.00
					296	NECTARINE	2	161.00	161.00
				BEVER FATS	74	SUGAR	1	4.00	4.00
					313	CAKE, COCONUT	1	60.38	62.50
					328	CARROT CAKE W NUTS	6	94.00	88.00
				COND.I	329	JELLO W PEACHES	2	80.00	80.00
					80	KOOLAID	15	358.00	330.00
					83	MARGARINE, SOY	7	9.29	10.00
				CHIPS	271	SALAD DRESSING-FRENCH	1	48.00	48.00
					273	SALAD DRESSING-ITALIAN	6	34.00	36.00
					325	GRAVY	14	44.71	49.00
				NONE DAIRY	85	CATSUP	1	27.00	27.00
					93	SALT	5	2.00	2.00
					289	TARTAR SAUCE	2	50.00	50.00
				MEAT	295	PICKLE-DILL	2	6.00	6.00
					296	CHOW MEIN NOODLES	3	7.73	8.00
					292	CRACKERS, SALTINES	4	27.59	27.50
				GRAIN	1	WATER	2	307.50	307.50
					45	MILK-LONFAT 2%	6	307.54	312.50
					41	MILK 2% CHOC	2	328.65	328.60
				VEGET	96	CHEESE-COTTAGE	1	82.50	82.00
					98	CHEDDAR CHEESE	12	23.95	28.50
					323	SWISS STEAK	10	91.16	100.00
				NONE DAIRY	324	ROAST TURKEY	26	70.46	69.00
					45	BREAD-WHITE	5	48.72	55.00
					47	BREAD-MIX GRAIN	27	37.33	48.00
				NONE DAIRY	150	MACARONI SALAD	3	64.00	81.00
					163	NOODLES	25	98.18	110.00
					177	RISSOLE POTATOES	3	79.73	92.00
				NONE DAIRY	186	POTATO SALAD	1	102.40	102.00
					197	CARROT RAISIN SALAD	3	73.73	86.00
					214	HERBED GREEN BEANS	20	69.21	81.00
				NONE DAIRY	225	MIXED VEGETABLES	8	117.42	126.50
					231	COLESLAW	7	55.22	48.00
					239	CUCUMBER-RAW	7	12.86	18.00
				NONE DAIRY	241	LETTUCE ICEBERG RAW	14	45.68	51.00
					249	TOMATO-RAW	8	29.25	26.00
					319	LYONNAISE WAX BEAN NO SALT	1	0.00	0.00
					332	WASHED POTATOES	8	101.07	103.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI				
MALE	DAY2	LUNC N=19	FLD	FRUIT	56	JUICE, PINEAPPLE, CANNED, VENDING	1	3967.50	3967.00				
					62	APPLE W SKIN	4	50.60	44.00				
					65	ORANGE MINUS SKIN	2	202.50	202.50				
					66	PEACH-FRESH-13%	3	81.67	98.00				
					67	PEAR-FRESH-8%	5	108.00	128.00				
					69	GRAPE JUICE	9	255.00	300.00				
					298	NECTARINE	1	152.95	152.00				
				DESRT	251	JELLO W FRUIT COCKTAIL	2	107.50	107.50				
					254	JELLO W FRUIT COCKTAIL	1	300.00	300.00				
					298	BROWNIE, FROSTED	5	55.51	48.00				
					300	CAKE, CARROT	3	120.00	144.00				
					313	CAKE, COCONUT	5	42.75	45.00				
					318	CAKE, SPONGE W O FROSTING	5	38.08	36.00				
					328	CARROT CAKE W NUTS	2	68.00	88.00				
					329	JELLO W PEACHES	3	91.67	100.00				
				BEVER	80	KOGLAID	17	236.47	240.00				
					263	TEA BREWED	2	247.50	247.50				
					83	MARGARINE, SOY	20	10.00	10.00				
				FATS	88	OLIVE-GREEN	1	11.70	11.00				
					273	SALAD DRESSING-ITALIAN	8	27.75	24.00				
					325	GRAVY	24	52.58	42.00				
				CONDI	85	CATSUP	3	27.00	27.00				
					89	PICKLE SWEET	1	0.00	.				
					93	SALT	6	1.25	1.00				
				MALE	DAY2	LUNC N=41	FAC	CHIPS	93	SALT	6	6.40	8.00
									290	CHOW MEIN NOODLES	5	7.33	11.00
									292	CRACKERS, SALTINES	6	7.33	11.00
								MEAT	303	VEAL PATTIE BREADED	12	137.00	137.00
									323	SWISS STEAK	7	103.00	103.00
									323	SWISS STEAK	7	103.00	103.00
								GRAIN	45	BREAD-WHITE	14	39.38	29.00
									47	BREAD-MIX GRAIN	13	31.38	24.00
									177	RISSOLE POTATOES	8	92.00	92.00
								VEGET	214	HERBED GREEN BEANS	5	81.00	81.00
									225	MIXED VEGETABLES	4	103.13	110.00
									241	LETTUCE ICEBERG RAW	8	39.69	42.00
								249	TOMATO-RAW	1	0.00	.	
								319	LYONNAISE WAX BEAN NO SALT	6	106.00	106.00	
FRUIT	332	WASHED POTATOES	10					160.94	167.00				
	62	APPLE W SKIN	5	166.44	167.00								
	85	ORANGE MINUS SKIN	2	213.75	213.50								
BEVER	86	PEACH-FRESH-13%	3	98.00	98.00								
	87	PEAR-FRESH-8%	9	147.80	180.00								
	80	KOGLAID	19	300.79	330.00								
FATS	83	MARGARINE, SOY	2	12.50	12.50								
	273	SALAD DRESSING-ITALIAN	3	16.00	12.00								
	325	GRAVY	16	39.20	40.00								
MALE	DAY2	DINN N=41	FAC	CONDI	93	SALT	1	2.00	2.00				
					40	MILK-LOWFAT 2%	3	330.42	228.00				
					41	MILK 2% CHOC	7	649.99	375.00				
				DAIRY	42	MILK-SKIM	2	240.00	240.00				
					44	YOGURT, W FRUIT YUM YO	2	227.00	227.00				
98	CHEDDAR CHEESE	9	22.83	30.00									

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
EMALE	DAY2	DINN N=39	FAC	NONE	7	EGG, HARD, CHOPPED	9	22.49	23.00
					129	SOUTHERN BAKED FISH	8	162.34	171.00
					302	VEAL PATTIE BREADED	22	139.18	137.00
					322	SWISS STEAK	6	104.72	103.00
					324	ROAST TURKEY	4	106.84	101.00
					45	BREAD-WHITE	20	58.55	58.00
					47	BREAD-MIX GRAIN	18	49.33	48.00
					161	RICE	19	140.06	116.00
					335	MACARONI SALAD	10	95.04	86.00
					102	CARROTS, PLAIN	7	95.54	83.00
					214	HERBED GREEN BEANS	5	74.52	81.00
					219	CABBAGE, COOKED, PLAIN	8	84.93	77.00
					225	MIXED VEGETABLES	4	94.88	98.00
					228	COLESLAW	3	164.70	162.00
					239	CUCUMBER-RAW	6	22.50	19.00
					241	LETTUCE ICEBERG RAW	14	45.54	50.00
					249	TOMATO-RAW	11	30.73	26.00
					319	LYONNAISE WAX BEAN NO SALT	4	18.52	105.00
					333	ONION FOR LO SWISS STEAK	2	63.00	105.00
					334	WASHED POTATOES	4	122.74	118.00
					336	CARROT RAISIN SALAD	18	190.92	158.00
					62	APPLE W/ SKIN	5	154.58	176.00
					63	BANANA MINUS SKIN	10	119.00	119.00
					6	ORANGE MINUS SKIN	1	225.00	225.00
					66	PEACH-FRESH-13%	4	93.10	98.00
					67	PEAR-FRESH-9%	0	160.00	162.00
					74	SUGAR	1	8.00	8.00
					264	JELLO W/ FRUIT COCKTAIL	0	108.33	110.00
					75	COFFEE BREWED	1	300.00	300.00
					80	KOOLAID	32	315.94	300.00
					200	TEA BREWED	3	320.00	330.00
					83	MARGARINE, SOY	19	11.32	10.00
					271	SALAD DRESSING-FRENCH	1	48.00	42.00
					272	SALAD DRESSING-ITALIAN	2	54.00	54.00
					273	SALAD DRESSING-ITALIAN	2	29.70	30.00
					277	SALAD DRESSING-THOUSAND ISLAND	4	37.50	40.00
					331	BROWN GRAY	27	44.07	46.00
					85	CATSUP	4	22.50	18.00
					89	PICKLE SWEET	1	60.00	60.00
					93	SALT	7	1.86	2.00
					289	TARTAR SAUCE	4	22.50	20.00
					295	PICKLE-DILL	1	18.00	18.00
					290	CHOW MEIN NOODLES	4	6.50	8.00
					292	CRACKERS, SALTINES	8	21.64	21.50
					1	WATER	3	280.00	330.00
					40	MILK-LOWFAT 2%	0	287.21	304.50
					41	MILK 2% CHOC	5	259.79	344.00
					95	CHEESE-COTTAGE	1	150.00	150.00
					98	CHEDDAR CHEESE	11	23.86	24.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
FEMALE	DAY2	DINN N=1	OTH	MEAT	7	EGG, HARD, CHOPPED	6	21.43	21.50
					128	SOUTHERN BAKED FISH	17	176.31	166.00
					303	VEAL PATTIE BREADED	17	117.26	137.00
					323	SWISS STEAK	2	103.00	102.50
					324	ROAST TURKEY	3	61.60	77.00
					45	BREAD-WHITE	5	51.62	58.00
					47	BREAD-MIX GRAIN	23	35.32	45.00
					151	RICE	21	76.98	88.00
					335	MACARONI SALAD	3	80.00	86.00
					186	POTATO SALAD	5	140.80	140.00
					192	CARROTS, PLAIN,	13	89.45	83.00
					214	HERBED GREEN BEANS	2	36.45	72.00
					219	CABBAGE, COOKED, PLAIN	7	77.40	86.00
					228	COLESLAW	3	78.95	81.00
					239	CUCUMBER-RAW	3	16.00	18.00
					241	LETTUCE ICEBERG RAW	14	45.36	50.00
					249	TOMATO-RAW	10	27.30	26.00
					319	LYONNAISE WAX BEAN NO SALT	2	108.65	108.00
					334	WASHED POTATOES	15	101.63	103.00
					338	CARROT RAISIN SALAD	2	102.70	102.50
	FRUIT				62	APPLE W/ SKIN	4	101.20	105.50
					63	BANANA MINUS SKIN	5	124.95	119.00
					65	GRANGE MINUS SKIN	2	174.38	174.00
					66	PEACH-FRESH-13%	5	88.20	98.00
					67	PEAR-FRESH-9%	7	145.29	162.00
					74	SUGAR	2	2.00	2.00
					254	JELLO W/ FRUIT COCKTAIL	8	74.17	80.00
					75	COFFEE BREWED	1	330.00	336.00
					80	KOOLAID	21	284.29	276.00
					260	TEA BREWED	4	228.75	240.00
	FATS				83	MARGARINE, SOY	17	10.15	10.00
					273	SALAD DRESSING-ITALIAN	6	22.00	18.00
					277	SALAD DRESSING-THOUSAND ISLAND	3	20.00	30.00
					331	BROWN GRAVY	18	40.20	40.00
					CONDII	85	CATSUP	3	24.00
	86					MUSTARD-YELLOW	1	20.00	20.00
	92					TABASCO SAUCE	1	3.00	3.00
	93					SALT	4	1.20	1.00
	289					TARTAR SAUCE	2	15.00	16.00
CHIPS	296				CHOW MEIN NOODLES	6	4.33	4.00	
	292				CRACKERS, SALTINES	11	12.75	11.00	
	1				WATER	1	240.00	240.00	
	305				FR FR FISH PORTION	1	109.40	109.00	
	47				BREAD-MIX GRAIN	1	24.00	24.00	
VEGET	222				CORN, WK PLAIN	1	148.00	148.00	
	314				CAKE, GERMAN CHOCOLATE	1	53.00	53.00	
	1				WATER	1	300.00	300.00	
	37				SWEET AND LO	1	2.00	2.00	
	40				MILK-LOWFAT 2%	27	277.83	244.00	
41	MILK 2% CHOC	5	313.00	344.00					
MALE	DAY3	BREK N=41	FAC	DAIRY					

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
FEMALE	DAYS	BREX N=40	FAC	MEAT	8	EGG, HARD, CHOPPED	4	62.50	50.00
					10	EGG-SCRAMBLED	31	87.84	96.00
					11	BACON-COOKED	26	22.82	19.00
					12	SAUSAGE PATTY	8	51.67	53.00
					107	CREAMED BEEF	1	579.39	679.00
					316	Bologna	2	46.48	46.00
				GRAIN	16	RAISIN BRAN KELLG	12	46.54	35.00
					19	CEREAL-CORN FLAKES KELLOGGS	8	26.62	21.00
					23	CEREAL-RICE KRISPIES	4	22.25	17.00
					30	FRENCH TOAST	11	88.36	90.00
					31	PANCAKE	23	89.56	93.00
					33	TOAST	19	57.47	56.00
					34	TOAST-MIX GRAIN WHEAT	10	50.37	46.00
					45	BREAD-WHITE	1	58.00	58.00
					337	OATMEAL	7	186.49	192.00
					338	GRITS	10	191.24	166.50
				LEGIM FRUIT	49	PEANUT BUTTER	4	64.00	64.00
					55	ORANGE JUICE	27	291.42	311.00
					62	APPLE W SKIN	2	176.00	175.50
					63	BANANA MINUS SKIN	21	110.50	119.00
					65	ORANGE MINUS SKIN	2	90.00	100.00
					67	PEAR-FRESH-9%	2	99.00	99.00
					69	GRAPE JUICE	5	384.00	300.00
					250	APPLESAUCE	2	189.00	189.00
					30	MAPLE SYRUP-ARTIFICIAL	32	58.31	60.00
				DESRT	71	JAM	1	13.00	15.00
					72	JELLY	8	37.27	35.00
					73	HONEY	1	24.00	24.00
					74	SUGAR	16	5.00	5.00
					75	COFFEE BREWED	3	250.00	240.00
					83	MARGARINE, SOY	19	11.05	10.00
					93	SALT	3	1.67	2.00
					40	MILK-LOWFAT 2%	18	265.76	259.00
					41	MILK 2% CHOC	6	382.57	344.00
				MEAT	8	EGG, HARD, CHOPPED	4	62.50	50.00
					9	CHEESE OMELET	1	117.00	117.00
					10	EGG-SCRAMBLED	13	76.80	86.00
					11	BACON-COOKED	20	19.25	22.00
					12	SAUSAGE PATTY	6	53.00	53.00
					316	Bologna	2	58.00	58.00
					316	EGG WHITE NO YOLK	2	23.25	23.00
					16	RAISIN BRAN KELLG	5	32.00	35.00
					19	CEREAL-CORN FLAKES KELLOGGS	9	23.19	21.00
					23	CEREAL-RICE KRISPIES	6	17.65	17.00
FEMALE	DAYS	BREX N=40	FAC	GRAIN	30	FRENCH TOAST	11	85.09	90.00
					31	PANCAKE	8	84.28	93.00
					32	WAFFLE, PLAIN, COMMERCIAL	3	72.00	72.00
					33	TOAST	6	50.87	56.00
					34	TOAST-MIX GRAIN WHEAT	14	28.26	23.00
					45	BREAD-WHITE	1	58.00	58.00
					47	BREAD-MIX GRAIN	3	39.20	45.00
					337	OATMEAL	7	218.28	235.00
					338	GRITS	4	112.34	114.50

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NJM	MEAN	MEDI
MALE	DAY3	LUNC N=29	FAC	LEGUM FRUIT	49	PEANUT BUTTER	9	33.07	32.00
					55	ORANGE JUICE	21	254.43	248.00
					67	PEACH DICED CND	2	72.45	72.00
					62	APPLE W SKIN	5	91.17	70.00
					63	BANANA MINUS SKIN	25	114.72	119.00
					65	ORANGE MINUS SKIN	1	168.75	168.00
					67	PEAR-FRESH-9%	4	114.75	117.00
					69	GRAPE JUICE	13	249.12	270.00
					260	APPLESAUCE	6	70.56	81.00
				DESRT	36	MAPLE SYRUP-ARTIFICIAL	19	65.86	60.00
					72	JELLY	6	14.20	14.00
					73	HONEY	4	10.50	12.00
					74	SUGAR	9	5.84	4.00
				BEVER FATS CONDI	75	COFFEE BREWED	1	300.00	300.00
					83	MARGARINE, SOY	18	10.00	10.00
					85	CATSUP	1	27.30	27.00
					93	SALT	1	.50	.
			DAIRY		40	MILK-LOWFAT 2%	5	231.80	274.00
					41	MILK 2% CHOC	6	474.72	500.00
					98	CHEDDAR CHEESE	7	38.36	36.00
					342	COTTAGE CHEESE W PEACHES	8	68.18	54.00
			MEAT		7	EGG, HARD, CHOPPED	7	21.36	23.00
					339	POLISH SAUSAGE	11	139.42	144.00
					136	BEEF STEW	17	374.12	312.00
					45	BREAD-WHITE	12	53.17	58.00
			COMBO GRAIN		47	BREAD-MIX GRAIN	14	42.00	48.00
					151	RICE	19	148.88	118.00
					155	MACARONI SALAD	5	57.00	48.00
					180	OVEN BROWNED POTATDES	12	96.13	90.50
			VEGET		187	POTATO SALAD	2	144.00	144.00
					204	MUSTARD GREENS, STEAMED	12	75.31	75.00
					237	HARVARD BEETS	3	68.50	72.00
					239	CUCUMBER-RAW	6	22.80	24.00
			FRUIT		241	LETTUCE ICEBERG RAW	12	51.67	52.50
					249	TOMATO-RAW	10	42.90	39.00
					340	SAUERKRAUT	7	50.75	48.00
					62	APPLE W SKIN	2	44.00	44.00
			DESRT		65	ORANGE MINUS SKIN	2	225.00	225.00
					66	PEACH-FRESH-13%	3	98.00	98.00
					67	PEAR-FRESH-9%	4	153.00	175.50
					69	GRAPE JUICE	4	315.00	315.00
					74	SUGAR	2	3.00	3.00
					254	JELLO W FRUIT COCKTAIL	2	190.00	190.00
					298	BROWNIE, FROSTED	1	122.00	122.00
					300	CAKE, CARROT	4	70.20	66.00
			BEVER		313	CAKE, COCONUT	3	57.00	54.00
					314	CAKE, GERMAN CHOCOLATE	2	74.23	73.50
					318	CAKE, SPONGE W O FROSTING	1	41.00	41.00
					75	COFFEE BREWED	1	240.00	240.00
					80	KOOLAID	18	311.87	330.00
					280	TEA BREWED	2	285.00	285.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
FEMALE	DAYS	LUNC N=24	FAC	FATS	83	MARGARINE, SOY	11	9.69	16.66
					263	BROWN GRAVY	7	50.51	52.00
					273	SALAD DRESSING-ITALIAN	2	36.66	36.66
					277	SALAD DRESSING-THOUSAND ISLAND	5	48.66	56.66
					279	SALAD DRESSING-FRENCH-LOW CAL	1	24.80	24.66
				CONDIT	89	PICKLE SWEET	1	45.66	45.66
					93	SALT	6	2.66	2.66
				CHIPS	290	CHOW MEIN NOODLES	6	14.67	13.66
					292	CRACKERS, SALTINES	7	16.89	19.66
				NONE	1	WATER	3	176.66	96.66
				DAIRY	46	MILK-LOWFAT 2%	7	293.25	320.66
					41	MILK 2% CHOC	4	320.43	242.66
					98	CHEDDAR CHEESE	11	13.66	13.66
					342	COTTAGE CHEESE W PEACHES	2	70.26	70.66
				MEAT	7	EGG, H/L, CHOPPED	4	19.49	21.66
					339	POLISH SAUSAGE	10	134.35	144.66
				COMBO	136	BEEF STEW	14	232.29	246.66
				GRAIN	34	TOAST-MIX GRAIN WHEAT	1	23.66	23.66
					45	BREAD-WHITE	4	58.66	58.66
					47	BREAD-MIX GRAIN	13	45.97	48.66
					161	RICE	12	143.96	136.66
					165	MACARONI SALAD	3	65.66	62.66
				VEGET	185	OVEN BROWNED POTATOES	7	95.25	94.66
					187	POTATO SALAD	1	121.66	121.66
					192	CARROTS, PLAIN,	2	83.66	83.66
					204	MUSTARD GREENS, STEAMED	6	18.75	15.66
					237	HARVARD BEETS	5	99.84	98.66
					239	CUCUMBER-RAW	3	22.66	24.66
					241	LETTUCE ICEBERG RAW	11	45.64	42.66
					249	TOMATO-RAW	6	36.83	39.66
				FRUIT	345	SAUERKRAUT	7	87.67	76.66
					62	APPLE W SKIN	3	166.61	174.66
					63	BANANA MIMUS SKIN	5	119.66	119.66
					65	PEACH-FRESH-13%	2	68.66	68.66
					67	PEAR-FRESH-9%	1	153.66	153.66
					69	GRAPE JUICE	3	240.66	240.66
					296	NECTARINE	1	161.66	161.66
					341	FRUIT MIX	1	164.50	164.66
				DESSERT	341	CAKE, CARROT	1	54.66	54.66
					306	CAKE, COCONUT	1	55.56	51.66
					313	CAKE, GERMAN CHOCOLATE	6	58.30	53.66
					314	CAKE, GERMAN CHOCOLATE	3	58.30	53.66
					328	CARROT CAKE W NUTS	5	58.68	63.66
					347	SPICE CAKE	4	68.40	66.66
				BEVER	75	COFFEE BREWED	1	600.66	600.66
					80	KOOLAID	7	219.04	216.66
					296	TEA BREWED	2	332.66	330.66
				FATS	83	MARGARINE, SOY	10	10.66	10.66
					263	BROWN GRAVY	1	52.66	52.66
					273	SALAD DRESSING-ITALIAN	5	24.66	24.66
					277	SALAD DRESSING-THOUSAND ISLAND	1	30.66	30.66
					279	SALAD DRESSING-FRENCH-LOW CAL	1	12.40	12.66

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
FEMALE	DAY3	LUNC N=18	FLD	COND I	85	CATSUP	6	27.00	27.00
					86	MUSTARD-YELLOW	2	10.00	10.00
					93	SALT	1	2.00	2.00
					290	CHOW MEIN NOODLES	3	8.67	8.60
					292	CRACKERS, SALTINES	5	11.00	11.00
					339	POLISH SAUSAGE	11	134.84	144.00
					136	BEEF STEW	11	213.90	222.00
					45	BREAD-WHITE	4	43.50	43.50
					47	BREAD-MIX GRAIN	13	11.72	48.00
					151	RICE	4	103.25	118.00
					180	OVEN BROWNED POTATOES	12	115.50	105.00
					204	MUSTARD GREENS, STEAMED	3	47.50	60.00
					237	HARVARD BEETS	6	96.00	96.00
					241	LETTUCE ICEBERG RAW	14	38.07	31.00
					249	TOMATO-RAW	10	11.70	13.00
					340	SAUERKRAUT	4	27.07	29.00
				FRUIT	62	APPLE W SKIN	2	176.00	176.00
					63	BANANA MINUS SKIN	4	119.00	119.00
					65	ORANGE MINUS SKIN	4	135.00	134.50
					66	PEACH-FRESH-13%	7	96.00	98.00
				BEVER FATS	67	PEAR-FRESH-9%	2	180.00	180.00
					68	KOOLAID	17	232.00	240.00
					263	BROWN GRAY	4	31.05	31.00
					277	SALAD DRESSING-THOUSAND ISLAND	10	10.95	10.00
MALE	DAY3	LUNC N=11	MRE	COND I NONE	93	SALT	2	1.50	1.50
					366	BEEF W BARBEQUE SAUCE	1	230.00	230.00
					367	FRANKFURTER	1	105.00	105.00
					368	HAM CHICKEN LOAF	3	93.33	140.00
					369	BEEF W GRAY	1	230.00	230.00
					371	BEEF PATTY	1	34.00	34.00
					372	BEEF STEW	1	230.00	230.00
					374	HAM SLICES	1	119.00	119.00
					376	PORK SAUSAGE PATTY	2	34.00	34.00
					378	CRACKERS	11	45.00	45.00
					380	BEANS IN TOMATO SAUCE	3	140.00	140.00
					381	CHEESE SPREAD	6	43.00	43.00
					382	JELLY MRE	1	28.00	28.00
					383	PEANUT BUTTER MRE & T-USA	4	43.00	43.00
						FORT A, C			
					384	APPLESAUCE	3	84.00	126.00
					385	FRUIT MIX DEHYDRATED	1	15.00	15.00
					386	PEACHES FREEZE DRIED	5	9.00	15.00
					389	BROWNIE-CHOCOLATE COVERED	2	50.00	52.00
					390	CAKE-CHERRY NUT	1	90.00	90.00
					391	COOKIES-CHOC COV	6	43.00	43.00
					395	CAKE-ORANGE NUT ROLL	1	90.00	90.00
					397	COFFEE-INSTANT	1	203.00	203.00
						RECONSTITUTED#702			
					400	COCOA POWDER-RECONSTITUTED#702	5	145.00	243.00
					402	SOUP GRAYV BASE MRE	1	7.00	7.00
					403	CANDY-AVG MRE	2	48.00	48.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
MALE	DAY3	DINN N=41	FAC	BEVER	404	GUM-NO NUTRIENTS	4	.63	2.00
					80	KOOLAI	6	225.00	210.00
					1	WATER	2	450.00	450.00
					40	MILK-LOWFAT 2%	2	503.25	503.00
					41	MILK 2% CHOC	6	474.72	500.50
					42	MILK-SKIM	1	240.00	240.00
					44	YOGURT, W	2	141.88	141.50
					98	FRUIT YUM YO	14	38.57	38.50
					7	CHEDDAR CHEESE	10	28.64	25.00
					339	EGG, HARD, CHOPPED	1	115.20	115.00
					349	POLISH SAUSAGE	9	189.34	197.00
					350	SAVORY CHIX BREAST QTRS	8	131.75	124.00
					136	SAVORY CHIX LEG QTRS	5	249.60	288.00
					351	BEEF STEW	19	312.79	283.00
					45	LASAGNA	19	55.48	58.00
					47	BREAD-WHITE	19	44.70	48.00
					151	BREAD-MIX GRAIN	20	114.85	118.00
					159	RICE	15	113.40	105.50
					180	MACARONI SLD AVE RX	8	85.75	84.00
					187	OVEN BROWNED POTATOES	3	161.28	128.00
					200	POTATO SALAD	5	127.83	130.00
					204	CARROTS NORMANDIE	3	75.00	75.00
					222	MUSTARD GREENS, STEAMED	1	72.08	74.00
					239	CORN, WK PLAIN	25	39.00	39.00
					241	CUCUMBER-RAW	2	55.28	57.50
					249	LETTUCE ICEBERG RAW	19	28.00	28.00
					330	TOMATO-RAW	13	124.42	130.00
					352	CARROT RAISIN SALAD	4	271.39	267.00
					62	POTATO BAKED	7	140.80	140.50
					63	APPLE W SKIN	2	122.40	119.00
					65	BANANA MINUS SKIN	7	169.75	202.50
					66	ORANGE MINUS SKIN	5	104.53	98.00
					68	PEACH-FRESH-13%	3	131.00	182.00
					67	PEAR-FRESH-9%	9	94.00	100.00
					254	JELLO W FRUIT COCKTAIL	5	320.62	315.00
					80	KOOLAI	32	270.00	270.00
					260	TEA BREWED	1	11.08	10.00
					83	MARGARINE, SOY	23	37.20	38.00
					273	SALAD DRESSING-ITALIAN	10	40.00	40.00
					277	SALAD DRESSING-THOUSAND ISLAND	3	60.00	60.00
					89	PICKLE SWEET	1	2.00	2.00
					93	SALT	6	40.00	40.00
					289	TARTAR SAUCE	1	21.00	21.00
					295	PICKLE-DILL	1	10.34	8.00
					290	CHOW MEIN NOODLES	7	22.00	22.00
					292	CRACKERS, SALTINES	3	310.00	330.00
FEMALE	DAY3	DINN N=39	FAC	NONE	1	WATER	3	330.42	335.00
					40	MILK-LOWFAT 2%	6	453.85	453.50
					41	MILK 2% CHOC	2	195.79	209.50
					44	YOGURT, W	4	23.25	24.00
					98	CHEDDAR CHEESE	12		

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
				MEAT	7	EGG, HARD, CHOPPED	6	23.19	23.66
					339	POLISH SAUSAGE	5	123.84	144.66
					349	SAVORY CHIX BREAST QTRS	9	266.63	197.66
				COMBO	350	SAVORY CHIX LEG QTRS	7	107.17	111.66
					136	BEEF STEW	7	277.71	278.66
					351	LASAGNA	10	281.58	297.66
				GRAIN	45	BREAD-WHITE	5	57.42	58.66
					47	BREAD-MIX GRAIN	27	38.31	45.66
					151	RICE	8	114.31	160.66
					159	MACARONI SLD AVE RX	5	73.73	72.66
				VEGET	187	POTATO SALAD	5	97.28	128.66
					206	CARROTS NORMANDIE	5	93.60	91.66
					204	MUSTARD GREENS, STEAMED	1	58.25	66.66
					222	CORN WK PLAIN	23	71.04	74.66
					236	THREE BEAN SALAD PER RX CARD	1	115.00	115.66
					239	CUCUMBER-RAW	2	21.00	21.66
					241	LETTUCE ICEBERG RAW	13	55.77	52.66
					249	TOMATO-RAW	6	32.50	32.66
					336	CARROT RAISIN SALAD	2	180.72	160.66
					340	SAUERKRAUT	1	34.20	34.66
				FRUIT	352	POTATO BAKED	11	207.48	204.66
					62	APPLE W SKIN	3	146.67	158.66
					63	BANANA MINUS SKIN	7	114.75	119.66
					65	ORANGE MINUS SKIN	4	101.25	108.66
					66	PEACH-FRESH-13%	4	82.67	85.66
					67	PEAR-FRESH-9%	3	90.00	90.66
					296	NECTARINE	1	80.50	80.66
				DESR	74	SUGAR	2	4.00	4.66
					254	JELLO W FRUIT COCKTAIL	11	110.45	100.66
				BEVER	79	TEA BREWED	1	300.00	300.66
					280	KOOLAID	23	226.24	240.66
				FATS	83	TEA BREWED	4	226.00	282.66
					283	MARGARINE, SOY	22	12.50	10.66
					273	BROWN GRAVY	1	49.40	49.66
					277	SALAD DRESSING-ITALIAN	3	40.60	36.66
					348	SALAD DRESSING-THOUSAND ISLAND	8	23.81	20.66
					88	SOUR CREAM	5	28.50	27.66
				CONDI	92	MUSTARD-YELLOW	1	9.50	9.66
					93	TABASCO SAUCE	1	3.00	3.66
					298	SALT	1	1.00	1.66
				CHIPS	292	CHOW MEIN NOODLES	6	8.00	6.66
					37	CRACKERS, SALTINES	5	13.75	11.66
				NONE	40	SWEET AND LO	1	2.00	2.66
			FAC	DAIRY	41	MILK-LOWFAT 2%	21	293.31	305.66
					44	MILK 2% CHOC	2	516.45	516.66
					96	YOGURT, W FRUIT YUM YO	4	227.00	227.66
					8	CHEESE-COTTAGE	1	165.00	165.66
				MEAT	10	EGG, HARD, CHOPPED	4	50.00	50.66
					11	EGG-SCRAMBLED	31	83.92	98.66
					12	BACON-COOKED	20	22.95	20.66
					310	SAUSAGE PATTY	12	51.01	53.66
						BOLOGNA	3	44.47	46.66

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
FEMALE	DAY4	BREK N=38	FAC	GRAIN	16	RAISIN BRAN KELLG	7	36.66	35.66
					19	CEREAL-CORN FLAKES KELLOGGS	6	21.36	21.66
					23	CEREAL-RICE KRISPIES	9	17.86	17.66
					31	PANCAKE	26	69.66	93.66
					32	WAFFLE, PLAIN, COMMERCIAL	14	66.34	76.66
					33	TOAST	5	55.44	56.66
					34	TOAST-MIX GRAIN WHEAT	3	36.67	23.66
					45	BREAD-WHITE	16	46.46	29.66
					47	BREAD-MIX GRAIN	7	49.37	48.66
					337	OATMEAL	1	256.66	256.66
					338	GRITS	15	163.72	172.66
					49	PEANUT BUTTER	3	51.26	32.66
				LEGUM VEGET FRUIT	35	HASH BROWN	12	73.61	73.66
					55	ORANGE JUICE	25	299.18	311.66
					57	PEACH DICED CND	1	62.16	62.66
					62	APPLE W SKIN	2	149.66	149.66
					63	BANANA MINUS SKIN	5	119.66	119.66
					64	GRAPE	5	54.66	42.66
					65	ORANGE MINUS SKIN	1	166.76	166.66
					66	PEACH-FRESH-13%	6	96.37	98.66
					67	PEAR-FRESH-9%	1	186.66	186.66
					69	GRAPE JUICE	8	256.75	336.66
				DESRT	259	APPLESAUCE	2	88.26	88.66
					30	MAPLE SYRUP-ARTIFICIAL	26	61.36	66.66
					71	JAM	5	26.66	26.66
					72	JELLY	6	35.66	35.66
				BEVER FATS	74	SUGAR	6	5.33	5.66
					75	COFFEE BREWED	1	186.66	186.66
					83	MARGARINE, SOY	12	16.4	16.66
					93	SALT	7	1.44	2.66
				DAIRY	322	CATSUP	3	16.26	16.66
					46	MILK-LOWFAT 2%	11	199.64	193.66
					41	MILK 2% CHOC	6	286.66	313.66
					44	YOGURT, W FRUIT YUM YO	3	128.63	113.66
				MEAT	96	CHEESE-COTTAGE	2	97.56	97.66
					6	EGG, HARD, CHOPPED	4	62.56	50.66
					16	EGG-SCRAMBLED	12	83.26	96.66
					11	BACON-COOKED	23	23.26	24.66
				GRAIN	12	SAUSAGE PATTY	2	53.66	53.66
					316	BOLOGNA	1	6.66	6.66
					16	RAISIN BRAN KELLG	1	36.66	35.66
					19	CEREAL-CORN FLAKES KELLOGGS	1	21.17	21.66
					23	CEREAL-RICE KRISPIES	5	17.62	17.66
					31	PANCAKE	14	87.36	93.66
					32	WAFFLE, PLAIN, COMMERCIAL	11	67.42	72.66
					33	TOAST	8	42.66	56.66
					34	TOAST-MIX GRAIN WHEAT	8	36.86	46.66
					338	GRITS	5	119.77	165.66
				LEGUM VEGET	49	PEANUT BUTTER	16	31.26	32.66
					35	HASH BROWN	12	66.66	73.66

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
MALE	275	LUNC N=40	FAC	NONE DAIRY	FRUIT	ORANGE JUICE	20	243.33	248.00
						PINEAPPLE CANNED IN JUICE	1	59.00	59.00
						APPLE W SKIN	8	69.30	68.00
						BANANA MINUS SKIN	10	107.10	119.00
						GRAPE	4	63.75	65.50
						PEACH-FRESH-13%	5	74.43	98.00
						PEAR-FRESH-9%	2	81.00	81.00
						GRAPE JUICE	12	244.88	266.00
						APPLESAUCE	1	75.00	75.00
						NECTARINE	4	118.74	136.50
						MAPLE SYRUP-ARTIFICIAL	20	67.75	60.00
					DESRT	JAM	3	21.67	28.00
						HONEY	4	5.70	11.00
						SUGAR	5	2.80	3.00
						COFFEE BREWED	2	285.00	285.00
						TEA BREWED	1	680.00	680.00
						MARGARINE, SOY	17	7.94	7.50
						SALT	2	1.00	1.00
						CATSUP	2	33.75	33.50
						WATER	1	330.00	330.00
						MILK-LOWFAT 2%	5	300.40	336.00
						MILK 2% CHOC	4	422.55	344.00
						CHEESE-COTTAGE	2	105.00	105.00
						COTTAGE CHEESE W PINEAPPLE	1	84.00	84.00
						COTTAGE CHEESE W PINEAPPLE	2	71.25	71.00
						CHEDDAR CHEESE	8	35.55	30.00
					MEAT	EGG, HARD, CHOPPED	10	21.85	23.00
						SWISS STEAK W MSHRM GRAVY	16	107.00	109.00
						PORK ADORO	24	312.47	322.00
						BACON-COOKED	8	11.05	13.00
						BREAD-WHITE	17	66.20	68.00
						BREAD-MIX GRAIN	20	45.30	48.00
						STEAMED RICE	22	194.92	151.00
						MACARONI SALAD	5	116.20	96.00
						WASHED POTATOES	16	115.71	117.00
					VEGET	POTATO SALAD	5	106.40	106.00
						ASPARAGUS, STEAMED	9	69.60	85.00
						BEANS, GREEN, CANNED, REG PK,	15	80.37	68.00
						DR SOLIDS			
						CUCUMBER-RAW	3	18.00	18.00
						LETTUCE ICEBERG RAW	14	52.50	52.50
						TOMATO-RAW	9	27.44	26.00
					FRUIT	APPLE W SKIN	2	158.40	158.00
						GRAPE	3	47.00	48.00
						ORANGE MINUS SKIN	4	213.75	225.00
						PEAR-FRESH-9%	7	144.00	144.00
						FRUIT MIX	1	85.50	85.00
						JELLO W FRUIT COCKTAIL	4	162.50	175.00
					DESRT	BROWNIE, FROSTED	7	86.27	67.00
						CAKE, CARROT	1	64.80	64.00
						CAKE, COCONUT	3	43.50	45.00
						CAKE, SPONGE W O FROSTING	11	42.86	41.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
FEMALE	DAY4	LUNC N=39	FAC	BEVER	88	KOOLAID	31	300.97	300.00
				BEVER	206	TEA BREWED	4	307.56	330.00
				FATS	83	MARGARINE, SOY	26	9.03	10.00
				FATS	273	SALAD DRESSING-ITALIAN	2	24.00	24.00
				FATS	279	SALAD DRESSING-FRENCH-LOW CAL	7	49.00	49.00
				FATS	287	GRAVY, BROWN	14	51.63	52.00
				CONDI	80	PICKLE SWEET	1	60.00	60.00
				CONDI	93	SALT	6	1.83	2.00
				CHIPS	295	PICKLE-DILL	1	12.00	12.00
				CHIPS	296	CHOW MEIN NOODLES	7	8.34	8.00
				CHIPS	292	CRACKERS, SALTINES	2	24.75	24.50
				NONE	1	WATER	3	180.00	150.00
				DAIRY	46	MILK-LOWFAT 2%	6	312.63	305.00
				DAIRY	41	MILK 2% CHOC	4	342.21	336.00
				MEAT	293	COTTAGE CHEESE W PINEAPPLE	1	84.00	84.00
				MEAT	327	COTTAGE CHEESE W PINEAPPLE	1	52.50	52.00
				MEAT	355	CHEDDAR CHEESE	3	27.00	27.00
				MEAT	7	EGG, HARD, CHOPPED	7	19.00	23.00
				MEAT	163	SWISS STEAK W MSHRM GRAVY	18	103.12	113.00
				GRAIN	121	PORK ADORO	17	227.65	236.00
				GRAIN	294	BACON-COOKED	6	10.38	12.00
				GRAIN	349	SAVORY CHIX BREAST QTRS	1	216.70	216.00
				GRAIN	350	SAVORY CHIX LEG QTRS	2	111.00	111.00
				GRAIN	45	BREAD-WHITE	5	57.42	58.00
				GRAIN	47	BREAD-NIX GRAIN	29	40.88	40.00
				GRAIN	147	STEAMED RICE	19	174.85	165.00
				VEGET	186	MACARONI SALAD	4	57.00	91.00
				VEGET	173	WASHED POTATOES	18	116.73	102.00
				VEGET	188	POTATO SALAD	2	108.00	108.50
				VEGET	209	ASPARAGUS, STEAMED	10	70.00	70.00
				VEGET	213	BEANS, GREEN, CANNED, REG PK,	20	89.67	102.00
				VEGET	239	DR SOLIDS	3	18.00	18.00
				VEGET	241	CUCUMBER-RAW	13	43.40	48.50
				VEGET	249	LETTUCE ICEBERG RAW	7	26.00	26.00
				FRUIT	62	TOMATO-RAW	9	101.49	88.00
				FRUIT	64	APPLE W SKIN	5	78.00	72.00
				FRUIT	65	GRAPE	3	176.25	225.00
				FRUIT	66	ORANGE MINIS SKIN	1	98.00	98.00
				FRUIT	341	PEACH-FRESH-13%	5	58.90	76.00
				FRUIT	264	FRUIT MIX	5	102.00	100.00
				DESSERT	296	JELLO W FRUIT COCKTAIL	17	81.00	73.00
				DESSERT	310	BROWNIE, FROSTED	10	42.23	43.00
				DESSERT	400	CAKE, SPONGE W O FROSTING	1	22.00	22.00
				DESSERT	75	COOKIES, OREO	1	330.00	330.00
				BEVER	86	COFFEE BREWED	22	229.77	240.00
				BEVER	86	KOOLAID	3	350.00	330.00
				FATS	260	TEA BREWED	17	11.47	10.00
				FATS	83	MARGARINE, SOY	6	28.40	24.00
				FATS	273	SALAD DRESSING-ITALIAN	2	12.00	11.50
				FATS	279	SALAD DRESSING-FRENCH-LOW CAL	17	50.78	52.00
				FATS	287	GRAVY, BROWN	17	50.78	52.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
MALE	DAY4	DINN N=31	FAC	CONDI	89	PICKLE SWEET	3	30.45	30.00
				CHIPS	93	SALT	5	1.48	2.00
					296	CHOW MEIN NOODLES	6	4.62	8.00
					292	CRACKERS, SALTINES	4	19.50	16.50
				NONE	1	WATER	1	330.00	330.00
				DAIRY	46	MILK-LOWFAT 2%	1	671.00	671.00
					41	MILK 2% CHOC	5	413.18	344.00
					44	YOGURT, W FRUIT YUM YO	3	227.00	22.00
					98	CHEESE-COTTAGE	2	120.00	170.00
					355	CHEDDAR CHEESE	13	29.91	18.00
				MEAT	7	EGG, HARD, CHOPPED	11	17.35	23.00
					121	PORK ADONO	6	268.83	247.00
					131	HAM STEAK	14	83.24	86.00
				COMBO	143	TURKEY ALA KING	11	229.27	213.00
				GRAIN	45	BREAD-WHITE	15	67.03	58.00
					47	BREAD-MIX GRAIN	15	49.00	48.00
					180	MACARONI SALAD	7	90.51	86.00
					358	NOODLES	18	169.69	99.00
				VEGET	170	MASHED POTATOES	16	138.20	133.00
					188	POTATO SALAD	2	172.80	172.00
					192	CARROTS, PLAIN	7	164.23	114.00
					220	CALIFLOWER	6	94.27	101.00
					239	CUCUMBER-RAW	7	19.29	18.00
					241	LETTUCE ICEBERG RAW	18	44.50	49.50
					249	TOMATO-RAW	11	30.43	26.00
				FRUIT	62	APPLE W SKIN	4	189.48	176.00
					63	BANANA MINUS SKIN	10	134.47	124.50
					67	PEAR-FRESH-9%	6	132.00	139.50
					69	GRAPE JUICE	1	180.00	180.00
				DEERT BEVER FATS	264	JELLO W FRUIT COCKTAIL	7	105.00	100.00
					80	KOOLAID	27	348.33	330.00
					93	MARGARINE, SOY	10	10.58	10.00
					284	BROWN GRAVY	15	50.27	52.00
					276	SALAD DRESSING-THOUSAND ISLAND	4	46.88	50.00
					279	SALAD DRESSING-FRENCH-LOW CAL	6	39.27	37.00
FEMALE	DAY4	DINN N=40	FAC	CONDI	89	PICKLE SWEET	1	40.00	40.00
					93	SALT	2	2.00	2.00
				CHIPS	296	CHOW MEIN NOODLES	1	15.00	15.00
				NONE	1	WATER	3	215.00	200.00
				DAIRY	46	MILK-LOWFAT 2%	6	259.25	305.00
					41	MILK 2% CHOC	2	352.13	351.50
					44	YOGURT, W FRUIT YUM YO	1	136.20	136.00
					98	CHEESE-COTTAGE	1	142.50	142.00
					355	CHEDDAR CHEESE	16	19.01	18.00
				MEAT	7	EGG, HARD, CHOPPED	6	16.29	16.00
					131	HAM STEAK	15	79.12	86.00
				COMBO	143	TURKEY ALA KING	23	192.55	184.00
				GRAIN	45	BREAD-WHITE	7	53.03	58.00
					47	BREAD-MIX GRAIN	28	39.90	48.00
					100	MACARONI SALAD	2	88.32	88.00
					355	NOODLES	22	95.70	82.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
MALE	DAY4	DINN N=9	FLD	VEGET	176	MASHED POTATOES	13	98.17	103.00
					188	POTATO SALAD	2	118.40	118.00
					192	CARROTS, PLAIN,	11	82.50	83.00
					226	CAULIFLOWER	12	88.80	101.00
					239	CUCUMBER-RAW	4	16.50	18.00
					241	LETTUCE ICEBERG RAW	17	35.44	46.00
					249	TOMATO-RAW	16	23.40	26.00
				FRUIT	62	APPLE W SKIN	11	111.20	108.00
					63	BANANA MINUS SKIN	9	108.42	119.00
					64	GRAPE	2	37.50	37.50
					65	ORANGE MINUS SKIN	2	196.88	196.50
					348	FRUIT COCKTAIL, CANNED, LIGHT SYRUP	5	72.20	76.00
				DESSERT BEVER	254	JELLO W FRUIT COCKTAIL	7	99.29	110.00
					75	COFFEE BREWED	1	330.00	330.00
				FATS	89	KOOLAID	24	245.63	240.00
					286	TEA BREWED	3	245.60	240.00
					83	MARGARINE, SOY	22	9.77	10.00
					284	BROWN GRavy	18	48.07	52.00
				CONDIMENT	276	SALAD DRESSING-THOUSAND ISLAND	2	26.66	26.00
					279	SALAD DRESSING-FRENCH-LOW CAL	9	26.67	24.00
					86	MUSTARD-YELLOW	1	5.00	5.00
					89	PICKLE SWEET	1	30.00	30.00
				CHIPS MEAT	93	SALT	5	1.40	1.00
					290	CHOW MEIN NOODLES	7	6.80	8.00
					131	HAW STEAK	4	98.90	90.00
					363	VEAL PATTIE BREADED	5	137.00	137.00
			GRAIN		45	BREAD-WHITE	6	58.00	58.00
					47	BREAD-MIX GRAIN	4	42.00	48.00
					149	RICE	2	144.00	143.50
					178	MASHED POTATOES	8	93.34	103.00
			VEGET		192	CARROTS, PLAIN,	3	50.67	30.00
					220	CAULIFLOWER	1	111.10	111.00
					241	LETTUCE ICEBERG RAW	6	46.26	50.00
					62	APPLE W SKIN	1	170.00	170.00
MALE	DAYS	BREK N=40	FAC	CONDIMENT NONE DAIRY	63	BANANA MINUS SKIN	2	119.00	119.00
					66	PEACH-FRESH-13%	5	94.00	98.00
					67	PEAR-FRESH-9%	1	180.00	180.00
				BEVER FATS	89	KOOLAID	9	416.67	270.00
					83	MARGARINE, SOY	6	16.83	10.00
					284	BROWN GRavy	7	52.74	52.00
					276	SALAD DRESSING-THOUSAND ISLAND	1	26.60	26.00
				CONDIMENT NONE DAIRY	93	SALT	1	1.00	1.00
					1	WATER	1	240.00	240.00
					40	MILK-LOWFAT 2%	21	205.57	305.00
					41	MILK 2% CHOC	2	318.22	328.50
					8	EGG, HARD, CHOPPED	6	100.00	100.00
			MEAT		10	EGG, SCRAMBLED	31	95.69	96.00
					11	BACON-COOKED	28	19.97	20.00
					12	SAUSAGE PATTY	5	49.82	53.00
					111	CREAMED BEEF	1	173.00	173.00
					316	BOLOGNA	2	87.00	87.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
FEMALE		BREX N=39	FAC	GRAIN	14	OATMEAL	5	224.76	192.00
					16	RAISIN BRAN KELLG	3	46.67	85.00
					19	CEREAL-CORN FLAKES KELLOGGS	7	21.30	21.00
					23	CEREAL-RICE KRISPIES	4	22.25	17.00
					30	FRENCH TOAST	14	96.50	90.00
					31	PANCAKE	20	101.14	93.00
					33	TOAST	14	59.90	56.00
					34	TOAST-MIX GRAIN WHEAT	13	30.71	48.00
					47	BREAD-MIX GRAIN	4	42.00	48.00
					358	GRITS	11	174.80	167.00
				LEGUM FRUIT	49	PEANUT BUTTER	5	47.04	48.00
					55	ORANGE JUICE	22	291.24	311.00
					57	PEACH DICED CND	1	0.00	
					62	APPLE W SKIN	7	181.03	105.00
					63	BANANA MINUS SKIN	12	113.05	136.00
					64	GRAPE	2	34.50	34.50
					66	PEACH-FRESH-13%	3	111.07	98.00
					67	PEAR-FRESH-9%	1	102.00	102.00
					68	PLUM-FRESH-5%	4	63.00	63.00
					69	GRAPE JUICE	11	346.30	300.00
				DESR	250	APPLESAUCE	2	116.50	116.50
					36	MAPLE SYRUP-ARTIFICIAL	30	59.50	60.00
					71	JAM	5	22.75	20.00
					72	JELLY	9	34.71	28.00
					74	SUGAR	8	4.50	4.00
					83	MARGARINE, SOY	13	10.73	10.00
				FATS COND DAIRY	93	SALT	3	1.27	1.50
					40	MILK-LOWFAT 2%	17	255.64	209.00
					41	MILK 2% CHOC	6	339.08	336.00
					90	CHEESE-COTTAGE	1	36.00	36.00
					6	OMELET, PLAIN	1	92.00	92.00
				MEAT	8	EGG, HARD, CHOPPED	3	76.00	76.00
					9	CHEESE OMELET	8	111.15	117.00
					10	EGG-SCRAMBLED	10	83.42	95.00
					11	BACON-COOKED	17	21.00	24.00
					12	SAUSAGE PATTY	7	53.00	53.00
					310	BOLOGNA	1	29.00	29.00
					315	EGG WHITE NO YOLK	1	31.00	31.00
				GRAIN	14	OATMEAL	9	141.48	133.50
					16	RAISIN BRAN KELLG	1	36.00	36.00
					19	CEREAL-CORN FLAKES KELLOGGS	1	20.83	21.00
					23	CEREAL-RICE KRISPIES	6	17.80	17.00
					30	FRENCH TOAST	10	90.72	90.00
					31	PANCAKE	10	72.54	88.00
					33	TOAST	8	33.42	28.00
					34	TOAST-MIX GRAIN WHEAT	12	30.19	23.00
					358	GRITS	5	109.29	102.00
				LEGUM	49	PEANUT BUTTER	8	50.25	50.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
MALE	280	N-27	FAC	DAIRY	55	ORANGE JUICE	21	259.46	248.66
					58	PEARS, LIGHT SIRUP PACK, SOLALIQ	1	164.66	164.66
					62	APPLE W SKIN	6	80.67	123.66
					63	BANANA MINUS SKIN	21	102.67	119.66
					64	GRAPE	3	47.66	45.66
					66	PEACH-FRESH-13%	5	80.36	98.66
					68	PLUM-FRESH-9%	2	67.72	67.66
					69	GRAPE JUICE	11	219.55	246.66
					286	APPLESAUCE	4	98.66	88.66
					288	NECTARINE	1	161.66	161.66
					36	MAPLE SYRUP-ARTIFICIAL	25	52.68	68.66
					71	JAM	3	9.53	13.66
					72	JELLY	5	19.66	14.66
					73	HONEY	3	8.66	12.66
					74	SUGAR	8	4.66	4.66
					75	COFFEE BREWED	2	216.66	216.66
					83	MARGARINE, SOY	16	9.74	16.66
					85	CATSUP	1	27.66	27.66
					93	SALT	1	1.66	1.66
					46	MILK-LOWFAT 2%	2	326.25	326.66
					41	MILK 2% CHOC	4	481.24	351.56
					98	CHEDDAR CHEESE	1	50.66	36.66
					365	CHEDDAR CHEESE	6	46.86	36.66
					7	EGG, HARD, CHOPPED	3	12.27	6.66
					365	FR FR FISH PORTION	7	169.46	169.66
					369	HAW STEAK	8	85.86	69.66
					116	CHILI	13	250.45	223.66
					45	BREAD-WHITE	15	63.86	58.66
					47	BREAD-MIX GRAIN	13	45.2	48.66
					51	BREAD-AMERICAN RYE	2	46.58	45.66
					164	RICE	14	168.43	131.66
					167	POTATOES, PLAIN	12	112.99	96.56
					215	SEASONED GREEN BEANS	2	6.66	55.66
					223	CORN, WK PLAIN	16	51.91	55.66
					234	COLESLAW	2	76.46	76.66
					239	CUCUMBER-RAW	3	24.66	24.66
					241	LETTUCE ICEBERG RAW	17	50.59	50.66
					249	TOMATO-RAW	11	26.66	26.66
					62	APPLE W SKIN	5	144.32	158.66
					65	ORANGE MINUS SKIN	1	262.56	262.66
					66	PEACH-FRESH-13%	1	127.46	137.66
					67	PEAR-FRESH-9%	6	198.66	186.66
					366	CAKE, CARROT	1	86.46	86.66
					366	JELLO W PINEAPPLE	1	156.66	156.66
					362	CAKE, COCONUT	1	54.66	54.66
					314	CAKE, GERMAN CHOCOLATE	2	58.36	58.66
					88	KOOLAID	25	266.46	276.66
					83	MARGARINE, SOY	5	15.66	15.66
					272	SALAD DRESSING-ITALIAN	7	16.71	18.66
					273	SALAD DRESSING-ITALIAN	1	24.66	24.66
					276	SALAD DRESSING-THOUSAND ISLAND	3	58.33	87.66

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
FEMALE	DAYS	LUNC N=9	FAC	CONDI	85	CATSUP	1	27.00	27.00
					89	PICKLE SWEET	2	50.00	50.00
					93	SALT	4	2.25	2.00
				CHIPS	289	TARTAR SAUCE	3	23.33	20.00
					290	CHOW MEIN NOODLES	5	7.84	8.00
					292	CRACKERS, SALTINES	3	18.33	22.00
				NONE	1	WATER	1	300.00	300.00
				DAIRY	41	MILK 2% CHOC	1	344.30	344.00
				MEAT	359	HAM STEAK	4	64.35	66.00
				COMBO	115	CHILI	6	234.16	223.00
				GRAIN	46	BREAD-WHITE	1	58.00	58.00
					47	BREAD-MIX GRAIN	7	39.43	48.00
					154	RICE	5	131.00	131.00
				VEGET	167	POTATOES, PLAIN	4	73.94	91.00
					215	SEASONED, GREEN BEANS	1	66.00	66.00
MALE	DAYS	LUNC N=10	FLD		223	CORN, WK PLAIN	8	55.00	55.00
					234	COLESLAW	1	64.00	64.00
				FRUIT	360	THREE BEAN SALAD	1	115.00	115.00
					82	APPLE W SKIN	5	129.48	176.00
				DESRT	88	PEACH-FRESH-13%	3	81.67	98.00
					298	BROWNIE, FROSTED	1	61.00	61.00
					302	JELLO W PINEAPPLE	1	130.00	130.00
				BEVER	80	KOOLAID	8	251.25	240.00
				CONDI	89	PICKLE SWEET	1	30.00	30.00
				MEAT	359	HAM STEAK	4	66.00	66.00
				COMBO	115	CHILI	6	282.47	258.00
				GRAIN	46	BREAD-WHITE	10	29.00	29.00
					47	BREAD-MIX GRAIN	10	24.00	24.00
				VEGET	154	RICE	3	183.40	167.00
FEMALE	DAYS	LUNC N=28	FLD		167	POTATOES, PLAIN	3	75.83	91.00
					215	SEASONED, GREEN BEANS	1	66.00	66.00
					223	CORN, WK PLAIN	8	56.38	55.00
				FRUIT	360	THREE BEAN SALAD	7	83.79	103.00
					82	APPLE W SKIN	2	290.40	290.00
					83	BANANA MINUS SKIN	5	154.70	142.00
				BEVER	87	PEAR-FRESH-9%	1	180.00	180.00
				CONDI	80	KOOLAID	10	153.00	150.00
					92	TABASCO SAUCE	4	3.50	2.50
					93	SALT	1	1.00	1.00
				NONE	1	WATER	4	273.75	300.00
				MEAT	359	HAM STEAK	10	65.34	66.00
				COMBO	115	CHILI	18	210.49	223.00
				GRAIN	46	BREAD-WHITE	6	51.72	58.00
					47	BREAD-MIX GRAIN	16	45.00	48.00
FEMALE	DAYS	LUNC N=28	FLD		51	BREAD-AMERICAN RYE	3	51.50	62.00
					154	RICE	12	118.88	131.00
				VEGET	167	POTATOES, PLAIN	15	87.66	91.00
					215	SEASONED, GREEN BEANS	4	68.26	68.00
					223	CORN, WK PLAIN	22	51.73	56.00
					241	LETTUCE ICEBERG RAW	12	12.08	11.00
					249	TOMATO-RAW	6	10.40	13.00
					360	THREE BEAN SALAD	2	115.00	115.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
MALE	DAYS	LUNC N=1	QTH	FRUIT	62	APPLE W SKIN	12	151.80	162.50
					66	PEACH-FRESH-13%	13	93.85	98.88
					67	PEAR-FRESH-8%	1	18.00	18.00
				BEVER	80	KOOL-AID	24	260.26	285.00
				FATS	276	SALAD DRESSING-THOUSAND ISLAND	10	38.38	50.00
				COND I	92	TABASCO SAUCE	1	5.00	5.00
				DAIRY	432	ICE CREAM SANDWICH	1	124.00	124.00
				COMED	144	BEEF STEW	1	264.00	264.00
				GRAIN	149	RICE	1	144.00	144.00
				VEGET	241	LETTUCE ICEBERG RAW	1	50.00	50.00
MALE	DAYS	DINN N=41	FAC	DESSERT	433	BLUEBERRY PIE	1	135.00	135.00
				BEVER	431	CARBONATED, ROOT BEER	1	300.00	300.00
				DAIRY	40	MILK-LOWFAT 2%	4	327.88	335.00
					41	MILK 2% CHOC	11	483.73	375.00
					44	YOGURT, W FRUIT YUM YO	4	227.00	227.00
					98	CHEESE-COTTAGE	1	300.00	300.00
					98	CHEDDAR CHEESE	4	37.50	30.00
				MEAT	365	EGG, HARD, CHOPPED	8	36.45	36.00
					7	POT ROAST	11	22.58	23.00
					102	ROAST TURKEY	17	71.49	70.00
				GRAIN	127	FR FR FISH PORTION	21	131.97	128.00
					305	BREAD-WHITE	1	109.40	109.00
					45	BREAD-MIX GRAIN	18	64.70	58.00
					47	NOODLES	22	44.45	48.00
					152	MACARONI SLD	16	172.40	134.00
					161	RICE	4	210.00	240.00
					363	SEASONED GREEN BEANS	22	120.55	122.00
				VEGET	184	POTATOES, PLAIN	12	92.75	94.50
					167	POTATO SALAD	1	91.00	91.00
					189	SPINICH-STEAMED NO SALT	3	149.33	128.00
					205	CORN, WK PLAIN	10	140.97	142.00
					223	COLESLAW	1	60.50	60.00
					234	CUCUMBER-RAW	2	70.40	70.00
					239	LETTUCE ICEBERG RAW	6	28.00	21.00
					241	ONION WHITE RAW	16	67.00	55.00
					243	TOMATO-RAW	1	44.00	44.00
					249	THREE BEAN SALAD	14	32.50	26.00
					300	PEACH DICED CND	2	105.25	155.00
				FRUIT	57	PEARS, LIGHT SIRUP PACK,	2	74.18	74.00
					58	SOLALIQ	1	30.75	30.00
					62	APPLE W SKIN	3	104.27	176.00
					63	BANANA MINUS SKIN	2	113.00	113.00
					66	ORANGE MINUS SKIN	7	184.82	225.00
					67	PEAR-FRESH-8%	3	130.00	100.00
					284	CRANBERRY SAUCE	1	120.00	120.00
					343	PLUMS CANNED, HEAVY SYRUP	2	58.00	58.00
					344	APRICOTS, CANNED, LIGHT SYRUP	1	40.00	40.00
				DESSERT	302	PINEAPPLE CANNED IN JUICE	2	17.50	17.00
					74	SUGAR	1	4.00	4.00
					302	JELLO W PINEAPPLE	10	110.00	100.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
FEMALE	DAY5	DINN N=39	FAC	BEVER FATS	80	KOOLAID	31	384.68	300.00
					83	MARGARINE, SOY	14	13.48	12.50
					270	SALAD DRESSING-FRENCH	3	18.20	15.00
					273	SALAD DRESSING-ITALIAN	3	30.00	36.00
				CONDI	276	SALAD DRESSING-THOUSAND ISLAND	7	37.14	37.00
					364	BROWN GRAVY	30	56.51	52.00
					88	MUSTARD-YELLOW	2	15.00	15.00
					89	PICKLE SWEET	1	100.00	100.00
				CHIPS	93	SALT	6	1.83	2.00
					289	TARTAR SAUCE	1	20.00	20.00
					290	CHOW MEIN NOODLES	8	12.50	8.00
					292	CRACKERS, SALTINES	4	30.25	33.00
				NONE DAIRY	1	WATER	4	307.50	300.00
					40	MILK-LOWFAT 2%	6	226.21	244.00
					41	MILK 2% CHOC	6	289.52	313.00
					42	MILK-SKIM	2	240.00	240.00
				MEAT	44	YOGURT, W FRUIT YUM YO	3	227.00	227.00
					355	CHEDDAR CHEESE	12	16.80	18.00
					102	EGG, HARD, CHOPPED	5	18.40	23.00
					127	POT ROAST	18	57.38	59.00
				GRAIN	359	ROAST TURKEY	19	97.37	107.00
					45	HAM STEAK	1	66.00	66.00
					47	BREAD-WHITE	7	46.61	58.00
					152	BREAD-MIX GRAIN	25	41.42	48.00
				VEGET	161	NOODLES	18	116.98	108.50
					363	MACARONI SLD	4	57.60	64.50
					184	RICE	13	101.14	102.00
					187	SEASONED GREEN BEANS	15	65.80	78.00
					189	POTATOES, PLAIN	3	69.77	81.00
					205	POTATO SALAD	3	85.33	102.00
					223	SPINICH-STEAMED NO SALT	8	88.75	74.50
					234	CORN, WK PLAIN	8	43.52	56.00
					239	COLESLAW	4	58.40	63.50
					241	CUCUMBER-RAW	4	18.00	18.00
					249	LETTUCE ICEBERG RAW	14	34.46	40.00
				FRUIT	360	TOMATO-RAW	7	31.57	26.00
					62	THREE BEAN SALAD	1	11.50	11.00
					63	APPLE W SKIN	15	97.39	88.00
					65	BANANA MINUS SKIN	10	106.91	119.00
				DESRT	67	ORANGE MINUS SKIN	1	180.00	180.00
					284	PEAR-FRESH-9%	1	0.00	.
					74	CRANBERRY SAUCE	1	72.00	72.00
					302	SUGAR	1	2.50	2.50
				BEVER	78	JELLO W PINEAPPLE	2	106.57	100.00
					79	DIET COLA	7	270.00	270.00
					80	TEA BREWED	2	330.00	330.00
					83	KOOLAID	1	240.00	240.00
				FATS	270	MARGARINE, SOY	26	11.77	10.00
					273	SALAD DRESSING-FRENCH	22	21.84	21.50
					276	SALAD DRESSING-ITALIAN	2	25.60	24.00
					364	SALAD DRESSING-THOUSAND ISLAND	6	38.33	41.00
						BROWN GRAVY	28	54.41	52.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
MALE	DAY8	BREK N=36	FAC	CONDI CHIPS	93	SALT	7	1.71	2.00
					290	CHOW MEIN NOODLES	7	5.89	6.00
					292	CRACKERS, SALTINES	1	22.00	22.00
				NONE	1	WATER	1	355.00	360.00
					40	MILK-LW-FAT 2%	20	328.20	320.00
				DAIRY	41	MILK 2% CHOC	3	323.43	313.00
					10	EGG-SCRAMBLED	25	101.18	90.00
					11	BACON-COOKED	14	18.68	17.00
					12	SAUSAGE PATTY	8	49.36	53.00
					310	Bologna	2	44.95	44.50
					415	EGG YOLK	1	30.00	30.00
				GRAIN	10	RAISIN BRAN KELLG	5	55.66	70.00
					19	CEREAL-CORN FLAKES KELLOGGS	11	22.07	21.00
					23	CEREAL-RICE KRISPIES	5	17.00	17.00
					31	PANCAKE	17	85.07	93.00
					32	WAFFLE, PLAIN, COMMERCIAL	10	61.20	72.00
					33	TOAST	7	60.00	50.00
					34	TOAST-MIX GRAIN WHEAT	11	38.47	40.00
					48	BREAD-WHITE	2	43.56	43.50
					47	BREAD-MIX GRAIN	2	30.00	30.00
					438	GRITS	9	150.94	167.00
				LEGUM VEGET	49	PEANUT BUTTER	8	45.00	44.00
					35	HASH BROWN	6	63.27	73.00
					410	HASH BR POTATOES	6	69.00	81.00
				FRUIT	55	ORANGE JUICE	22	311.71	295.00
					62	APPLE W SKIN	2	132.00	132.00
					63	BARANA MIX-JS SKIN	13	117.17	119.00
					60	PEACH-FRESH-13%	1	90.00	90.00
					67	PEAR-FRESH-0%	1	72.00	72.00
					68	PLUM-FRESH-5%	4	92.93	94.00
					69	GRAPE JUICE	1	312.50	330.00
					200	APPLESAUCE	6	100.00	100.00
					206	NECTARINE	2	101.00	101.00
				DESRT	30	MAPLE SYRUP-ARTIFICIAL	23	50.43	60.00
					71	JAM	2	19.50	19.50
					72	JELLY	10	30.04	20.00
					73	HONEY	2	10.00	10.00
					74	SUGAR	8	3.03	3.00
					75	COFFEE BREWED	2	202.50	202.50
				BEVER FATS	83	MARGARINE, SOY	12	13.33	15.00
					85	CATSUP	2	22.50	22.50
				NONE	93	SALT	6	1.83	2.00
					1	WATER	1	0.00	
				DAIRY	40	MILK-LW-FAT 2%	19	250.00	244.00
					41	MILK 2% CHOC	4	273.87	328.50
					44	YOGURT W FRUIT YUM YO	1	227.00	227.00
					293	COTTAGE CHEESE W PINEAPPLE	1	73.50	73.00
					8	EGG, HARD, CHOPPED	4	43.75	50.00
				MEAT	10	EGG-SCRAMBLED	10	91.20	90.00
					11	BACON-COOKED	20	23.21	25.00
					12	SAUSAGE PATTY	3	53.00	53.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
MALE	DAYS	BREQ N=16	FLD	MEAT	16	RAISIN BRAN KELLG	3	32.68	35.66
					19	CEREAL-CORN FLAKES KELLOGGS	6	24.67	21.66
					23	CEREAL-RICE KRISPIES	9	16.51	17.66
					31	PANCAKE	15	84.61	93.66
					32	WAFFLE, PLAIN, COMMERCIAL	12	71.25	72.66
					33	TOAST	5	59.12	56.66
					34	TOAST-MIX GRAIN WHEAT	11	31.57	23.66
					47	BREAD-MIX GRAIN	1	46.86	46.66
					438	GRITS	8	137.16	269.66
				LEGUM VEGET	49	PEANUT BUTTER	8	39.66	32.66
					35	HASH BROWN	16	59.31	73.66
					416	HASH BR POTATOES	1	76.56	76.66
				FRUIT	55	ORANGE JUICE	26	269.79	263.56
					62	APPLE W SKIN	4	68.66	61.56
					63	BANANA MINUS SKIN	4	185.36	119.66
					64	PEACH-FRESH-13%	24	24.56	36.56
					67	PEAR-FRESH-9%	2	112.56	112.56
					68	PLUM-FRESH-9%	4	43.31	21.56
					69	GRAPE JUICE	13	249.23	246.66
					250	APPLESAUCE	3	53.26	79.56
				DESRT	296	NECTARINE	1	161.66	161.66
					36	MAPLE SYRUP-ARTIFICIAL	26	55.64	66.66
					72	JELLY	3	17.75	26.66
					73	HONEY	1	12.66	12.66
					74	SUGAR	16	4.36	4.66
MALE	DAYS	BREQ N=16	FLD	BEVER	74	COFFEE BREWED	2	187.56	187.56
					75	TEA BREWED	1	156.66	156.66
				FATS	79	MARGARINE, SOY	26	8.25	16.66
					83	CREAMER, NON DAIRY, PWD	1	1.56	1.66
				COND I	84	CATSUP	5	14.46	18.66
					85	SALT	3	1.16	1.56
				MEAT	93	EGG, HARD, CHOPPED	3	96.66	166.66
					8	EGG-SCRAMBLED	5	86.46	96.66
					10	BACON-COOKED	5	17.66	17.66
				GRAIN	11	SAUSAGE PATTY	4	42.46	42.66
					12	BOLOGNA	2	29.66	29.66
					316	OATMEAL	4	214.66	214.66
				FRUIT	14	WAFFLE, PLAIN, COMMERCIAL	5	46.56	36.66
					32	GRITS	8	177.65	177.56
					438	ORANGE JUICE	2	311.66	311.66
				DESRT	55	APPLE W SKIN	16	181.87	176.66
					62	PEACH-FRESH-13%	6	85.75	85.56
					66	MAPLE SYRUP-ARTIFICIAL	4	66.56	66.66
				FATS	36	SUGAR	8	2.67	2.66
					74	MARGARINE, SOY	3	7.56	7.56
				DAIRY	83	MILK 2% CHOC	2	838.67	344.66
					41	MILK-SKIN	3	246.66	246.66
					42	CHEDDAR CHEESE	1	32.46	32.66
				MEAT	355	CHIX QUART BREAST	1	127.66	127.66
					122	CHIX QUART LEG	1	144.66	168.66
					123	GRILLED STEAK	3	162.66	169.66
					411		8		

Sex	Date	Mos	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
FEMALE	DAY6	LUNC N=19	FAC	NONE DAIRY	45	BREAD-WHITE	6	62.63	68.00
					47	BREAD-MIX GRAIN	5	45.85	48.00
					148	RICE	2	116.00	116.00
					182	MACARONI SALAD	3	83.20	86.00
					176	MASHED POTATOES	9	119.34	112.00
					194	CARROTS, PLAIN,	4	90.75	104.50
					212	BEANS LIMA, CANNED	3	48.16	71.50
					239	CUCUMBER-RAW	1	18.00	18.00
					241	LETTUCE ICEBERG RAW	7	28.79	26.00
					249	TOMATO-RAW	7	14.86	13.00
					62	APPLE W SKIN	2	123.20	123.00
					63	BANANA MINUS SKIN	3	91.23	136.00
					65	ORANGE MINUS SKIN	2	226.00	226.00
					67	PEAR-FRESH-8%	3	177.00	180.00
					298	BROWNIE, FROSTED	1	61.00	61.00
					318	CAKE, SPONGE W O FROSTING	2	36.90	38.50
					328	CARROT CAKE W NUTS	2	120.00	120.00
					86	KOOLAID	10	241.50	300.00
					266	TEA BREWED	1	360.00	360.00
					83	MARGARINE, SOY	7	11.39	10.00
					265	BROWN GRAVY	10	50.70	52.00
					270	SALAD DRESSING-FRENCH	5	37.44	23.00
					93	SALT	1	2.00	2.00
					286	STEAK SAUCE	2	22.50	22.50
					290	CHOW MEIN NOODLES	2	8.00	8.00
					292	CRACKERS, SALTINES	2	0.00	0.00
					1	WATER	1	300.00	300.00
					48	MILK-LOWFAT 2%	5	274.50	274.00
					41	MILK 2% CHOC	2	187.80	187.50
					365	CHEDDAR CHEESE	8	31.06	30.50
					7	EGG, HARD, CHOPPED	3	13.03	11.00
					122	CHIX QUART BREAST	1	101.00	101.00
					123	CHIX QUART LEG	5	101.52	97.00
					411	GRILLED STEAK	11	101.16	109.00
					45	BREAD-WHITE	4	39.15	42.00
					47	BREAD-MIX GRAIN	13	42.00	48.00
					148	RICE	7	100.21	103.00
					162	MACARONI SALAD	2	57.00	57.00
					176	MASHED POTATOES	2	110.88	112.00
					194	CARROTS, PLAIN,	10	92.95	103.00
					212	BEANS LIMA, CANNED	4	74.00	72.00
					239	CUCUMBER-RAW	3	10.00	18.00
					241	LETTUCE ICEBERG RAW	3	41.14	45.00
					249	TOMATO-RAW	11	26.00	26.00
					413	CARROT RAISIN SLD	6	45.42	45.00
					62	APPLE W SKIN	2	158.40	158.00
					63	BANANA MINUS SKIN	1	120.49	119.00
					64	GRAPE	4	21.00	21.00
					68	PLUM-FRESH-8%	1	31.50	63.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
MALE						JELLO W FRUIT COCKTAIL	2	110.00	110.00
						BROWNIE, FROSTED	1	61.00	61.00
						CAKE, SPONGE W O FROSTING	7	52.71	41.00
						CARROT CAKE W NUTS	6	90.46	90.00
						CAKE, APPLE CINNAUGH	3	66.83	55.00
						DIET COLA	2	285.00	785.00
						KOOLAID	6	258.00	240.00
						TEA BREWED	1	90.00	90.00
						SODA FRUIT	1	240.00	240.00
						KOOLADE SWEET	6	186.00	210.00
						MARGARINE, SOY	11	11.82	10.00
						BROWN GRAVY	12	45.50	52.00
						SALAD DRESSING-FRENCH	6	17.16	15.00
						SALAD DRESSING-ITALIAN	2	24.00	24.00
						SALAD DRESSING-THOUSAND ISLAND	2	37.50	37.00
						PICKLE SWEET	1	20.00	40.00
						SALT	3	1.33	1.00
						STEAK SAUCE	1	20.00	20.00
						CATSUP	1	27.00	27.00
						CHOW MEIN NOODLES	4	4.50	4.00
						CRACKERS, SALTINES	3	18.52	22.00
						FRANKFURTER	1	105.00	105.00
						CRACKERS	1	45.00	45.00
						BEANS IN TOMATO SAUCE	1	140.00	140.00
						JELLY WRE	1	28.00	28.00
						CAKE-PINEAPPLE MUT NO!	1	90.00	90.00
						COCOA POWDER-RECONSTITUTED#70Z	1	243.00	243.00
						CANDY-AVG WRE	1	48.00	48.00
						GUM-NO NUTRIENTS	1	5.00	5.00
						CHIX QUART BREAST	9	118.53	127.00
						CHIX QUART LEG	4	102.00	102.50
						GRILLED STEAK	7	109.00	109.00
						BREAD-WHITE	9	42.67	48.00
						BREAD-WIX GRAIN	7	110.00	115.00
						RICE	11	104.30	112.00
						MASHED POTATOES	5	77.00	104.50
						CARROTS, PLAIN,	6	110.07	111.00
						BEANS LIMA, CANNED	15	30.00	25.00
						LETTUCE ICEBERG RAW	16	14.03	13.00
						TOMATO-RAW	6	176.13	178.00
						APPLE W SKIN	3	225.00	225.00
						ORANGE MINUS SKIN	3	105.35	98.00
						PEACH-FRESH-13%	8	225.00	180.00
						PEAR-FRESH-9%	4	161.00	161.00
						NECTARINE	1	336.07	300.00
						KOOLAID	9	238.13	240.00
						KOOLADE SWEET	8	25.00	25.00
						MARGARINE, SOY	1	50.05	52.00
						BROWN GRAVY	16	21.17	15.00
						SALAD DRESSING-FRENCH	14		

Sex	Date	Meal	LDC	GROUP	CODE	Food Code	NMI	MEAN	MEDI
FEMALE	DAY6	LUNC N=26	FLD	CONDI	93	SALT	9	1.67	2.66
					286	STEAK SAUCE	2	16.00	16.00
					1	WATER	2	246.00	246.00
					122	CHIX QUART BREAST	7	119.74	127.66
					123	CHIX QUART LEG	2	99.90	99.56
					411	GRILLED STEAK	11	142.88	152.00
					45	BREAD-WHITE	1	29.00	29.00
					47	BREAD-MIX GRAIN	15	49.28	48.00
					148	RICE	13	112.35	115.00
					175	WASHED POTATOES	6	94.27	112.00
					194	CARROTS, FLAIN,	11	88.50	110.00
					212	BEANS LIMA, CANNED	5	103.23	111.00
					241	LETTUCE ICEBERG RAW	20	25.08	25.00
					249	TOMATO-RAW	9	17.33	19.00
					62	APPLE W/ SKIN	4	132.00	140.00
					63	BANANA MINUS SKIN	3	115.03	119.00
					65	PEACH-FRESH-13%	10	83.30	85.00
					67	PEAR-FRESH-9%	3	174.00	180.00
					296	NECTARINE	1	161.00	161.00
					86	KOOLAID	16	217.00	246.00
MALE	DAY6	LUNC N=8	MRE	NONE	83	MARGARINE, SOY	5	11.80	10.00
					285	BROWN GRAY	16	50.38	52.00
					270	SALAD DRESSING-FRENC'	18	12.82	14.00
					93	SALT	4	1.50	1.00
					286	STEAK SAUCE	6	15.42	10.00
					357	FRANKFURTER	1	105.00	105.00
					360	HAM CHICKEN LOAF	1	140.00	140.00
					369	BEEF W/ GRAVY	1	230.00	230.00
					371	BEEF PATTY	1	17.00	17.00
					372	BEEF STEW	1	230.00	230.00
					374	HAM SLICES	1	119.00	119.00
					375	MEATBALLS W/ BARBEQUE SAUCE	2	230.00	230.00
					376	CRACKERS	7	45.00	45.00
					379	POTATO PATTY NO!	2	21.25	21.00
					380	BEANS IN TOMATO SAUCE	2	140.00	140.00
					381	CHEESE SPREAD	3	35.83	43.00
					382	JELLY MRE	3	28.00	28.00
					383	PEANUT BUTTER MRE & T-USDA FORT A, C	2	43.00	43.00
					384	APPLESAUCE	1	126.00	126.00
					385	FRUIT MIX DEHYDRATED	1	15.00	15.00
					386	PEACHES FREEZE DRIED	2	15.00	15.00
					389	BROWNIE-CHOCOLATE COVERED	1	50.00	50.00
					390	CAKE-CHERRY NUT	1	90.00	90.00
					392	CAKE-CHOCOLATE NUT NO!	2	90.00	90.00
					395	CAKE-ORANGE NUT ROLL	1	90.00	90.00
					397	COFFEE-INSTANT	1	203.00	203.00
						RECONSTITUTED#70Z			
					398	CREAM SUBSTITUTE-NON DAIRY	1	4.00	4.00
					399	GRANULATED SUGAR	1	6.00	6.00
					400	COCOA POWDER-RECONSTITUTED#70Z	1	243.00	243.00
					403	CANDY-AVG MRE	2	48.00	48.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
MALE	DAY6	DINN N=35	FAC	BEVER	88	KOOLAI	7	398.57	450.00
					48	MILK-LOWFAT 2%	3	330.42	335.00
				DAIRY	41	MILK 2% CHOC	9	376.00	313.00
					42	MILK-SKIM	1	30.00	30.00
				MEAT	44	YOGURT, W FRUIT YUM YO	3	348.07	363.00
					355	CHEDDAR CHEESE	8	22.95	21.00
					421	YOGURT, TRIMLINE	1	249.00	240.00
					7	EGG, HARD, CHOPPED	9	20.32	23.00
					132	NE BOILED CORNED BEEF	6	94.30	96.00
					136	SPANISH BEEF	19	109.92	119.00
					294	BACON-COOKED	3	19.72	22.00
					411	GRILLED STEAK	5	143.05	126.00
					45	BREAD-WHITE	16	54.92	58.00
					47	BREAD-MIX GRAIN	16	39.30	48.00
					162	MACARONI SALAD	3	70.40	96.00
					410	RICE	20	91.71	103.00
				VEGET	174	MASHED POTATOES, AVE RX	9	163.71	108.00
					282	BROCCOLI STEAMED	8	80.00	70.00
				FRUIT	207	VEGETABLES FOR NE DINNER	5	147.00	210.00
					227	PEAS, CANNED, REG, DR'D	12	82.03	92.00
					239	CUCUMBER-RAW	6	18.00	12.00
					241	LETTUCE ICEBERG RAW	16	48.44	50.00
					243	ONION WHITE RAW	1	22.00	22.00
					249	TOMATO-RAW	14	25.07	26.00
					413	CARROT RAISIN SLD	1	158.00	158.00
					417	POTATO SALAD	4	110.40	108.00
					418	COLESLAW	1	6.00	6.00
					62	APPLE W SKIN	5	112.04	88.00
63	BANANA MINUS SKIN	4	110.00		119.00				
65	ORANGE MINUS SKIN	2	281.26		281.00				
66	PEACH-FRESH-13%	4	107.88		107.00				
67	PEAR-FRESH-9%	2	108.00		108.00				
69	GRAPE JUICE	1	300.00		300.00				
DESSERT	251	JELLO W FRUIT COCKTAIL	2		105.00	105.00			
	302	JELLO W PINEAPPLE	1	75.00	75.00				
BEVER	75	COFFEE BREWED	1	330.00	330.00				
	80	KOOLAI	23	309.00	309.00				
FATS	260	TEA BREWED	2	270.00	270.00				
	83	MARGARINE, SOY	10	12.00	10.00				
CONDY	265	BROWN GRAY	28	54.00	52.00				
	270	SALAD DRESSING-FRENCH	6	31.20	40.00				
	273	SALAD DRESSING-ITALIAN	5	33.00	30.00				
	419	GRAVY FOR SPAN BEEF	7	42.01	38.00				
	86	MUSTARD-YELLOW	1	10.00	10.00				
	89	PICKLE SWEET	1	50.00	50.00				
	93	SALT	4	1.75	2.00				
CHIPS	289	TARTAR SAUCE	1	10.00	10.00				
	322	CATSUP	1	6.00	8.00				
	290	CHOW MEIN NOODLES	5	8.00	8.00				
	292	CRACKERS, SALTINES	3	22.00	22.00				

289

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
FEMALE	DAY6	DINN N=38	FAC	NONE DAIRY	1	WATER	4	246.86	246.86
					46	MILK-LOWFAT 2%	6	340.56	340.56
					41	MILK 2% CHOC	5	322.39	344.86
					355	CHEDDAR CHEESE	8	25.42	18.86
					421	YOGURT, TRIMLINE	4	219.69	222.86
				MEAT	7	EGG, HARD, CHOPPED	5	21.85	23.86
					132	NE BOILED, CORNED BEEF	11	76.86	69.86
					136	SPANISH BEEF	28	105.91	119.86
					294	BACON-COOKED	1	39.86	39.86
				GRAIN	411	GRILLED STEAK	3	129.57	126.86
					45	BREAD-WHITE	7	45.57	58.86
					47	BREAD-MIX GRAIN	17	44.82	48.86
					51	BREAD-AMERICAN RYE	9	49.88	62.86
				VEGET	162	MACARONI SALAD	5	78.72	96.86
					416	RICE	18	91.64	97.58
					174	MASHED POTATOES, AVE RX	12	92.78	92.86
					202	BROCCOLI STEAMED	13	74.84	76.86
					207	VEGETABLES FOR ME DINNER	5	89.66	77.86
					227	PEAS, CANNED, REG, DR'D	14	81.49	92.86
					239	CUCUMBER-RAW	1	12.86	12.86
					241	LETTUCE ICEBERG RAW	10	43.86	56.86
					249	TOMATO-RAW	5	28.86	26.86
					413	CARROT RAISIN SLD	2	63.26	62.58
MALE	DAY6	DINN N=9	FLD	FRUIT	417	POTATO SALAD	4	94.48	108.58
					418	CUCESLAW	5	163.68	64.86
					62	APPLE W SKIN	6	65.87	76.86
					63	BANANA MINUS SKIN	9	115.83	119.86
				DEERT	65	ORANGE MINUS SKIN	3	249.86	225.86
					66	PEAR-FRESH-13%	4	73.58	73.58
					67	PEAR-FRESH-9%	5	153.86	189.86
					74	SUGAR	1	2.86	2.86
				BEVER	251	JELLO W FRUIT COCKTAIL	6	93.33	105.86
					78	DIET COLA	1	336.86	336.86
					79	TEA BREWED	1	150.86	150.86
					86	KOOLAID	24	238.25	240.86
				FATS	268	TEA BREWED	2	150.86	150.86
					336	SOOA FRUIT	1	210.86	210.86
					83	MARGARINE, SOY	23	10.85	10.86
				CONDIT	266	BROWN GRAVY	24	46.58	52.86
					270	SALAD DRESSING-FRENCH	2	23.81	22.56
					272	SALAD DRESSING-ITALIAN	1	45.86	45.86
					273	SALAD DRESSING-ITALIAN	3	32.72	36.86
					276	SALAD DRESSING-THOUSAND ISLAND	2	18.75	18.58
					419	GRAVY FOR SPAN BEEF	8	20.19	19.86
					86	MUSTARD-YELLOW	1	10.86	10.86
					93	SALT	7	1.21	1.83
					322	CATSUP	1	54.86	54.86
					298	CHOW MEIN NOODLES	6	6.87	6.86
				CHIPS MEAT	132	NE BOILED CORNED BEEF	7	115.33	131.86
					135	SPANISH BEEF	2	178.58	178.58

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI	
MALE	291	BREK N=38	FAC		45	BREAD-WHITE	7	29.00	29.00	
					47	BREAD-MIX GRAIN	9	32.00	24.00	
					416	RICE	6	138.00	120.50	
					174	WASHED POTATOES, AVE RX	2	103.00	103.00	
					207	VEGETABLES FOR NE DINNER	2	87.50	87.50	
					223	CORN, WK PLAIN	5	91.30	99.00	
					227	PEAS, CANNED, REG, DR'D	2	92.00	92.00	
					241	LETTUCE ICEBERG RAW	9	44.44	50.00	
					249	TOMATO-RAW	6	11.02	13.00	
				FRUIT	62	APPLE W SKIN	3	176.00	176.00	
					63	BANANA MINUS SKIN	1	142.00	142.00	
					65	ORANGE MINUS SKIN	1	226.00	226.00	
					67	PEAR-FRESH-9%	5	180.00	180.00	
			BEVER FATS		80	KOOLAID	9	283.33	300.00	
					83	MARGARINE, SOY	4	8.25	5.00	
					266	BROWN GRAVY	7	81.71	104.00	
					273	SALAD DRESSING-ITALIAN	6	20.00	24.00	
			CONDI NONE		93	SALT	1	1.00	1.00	
					1	WATER	1	305.00	300.00	
					37	SWEET AND LO	1	2.00	2.00	
					46	MILK-LOWFAT 2%	16	356.28	350.50	
			DAIRY		41	MILK 2% CHOC	4	291.25	328.50	
					421	YOGURT, TRIMLINE	1	240.00	240.00	
					16	EGG-SCRAMBLED	28	107.63	90.00	
					11	BACON-COOKED	18	21.63	17.00	
			MEAT		12	SAUSAGE PATTY	10	52.20	53.00	
					310	Bologna	1	29.00	29.00	
					415	EGG YOLK	1	30.00	30.00	
					14	OATMEAL	3	164.07	171.00	
			GRAIN		16	RAISIN BRAN KELLG	6	40.83	36.00	
					19	CEREAL-CORN FLAKES KELLOGGS	10	27.69	21.00	
					23	CEREAL-RICE KRISPIES	3	23.73	17.00	
					31	PANCAKE	17	93.00	93.00	
					33	TOAST	13	53.31	55.00	
					34	TOAST-MIX GRAIN WHEAT	11	35.34	40.00	
					422	FRENCH TOAST	12	82.50	90.00	
					424	HOT GRITS	11	107.59	102.50	
			LEGUM FRUIT		49	PEANUT BUTTER	3	43.26	32.00	
					55	ORANGE JUICE	19	279.90	311.00	
					62	APPLE W SKIN	3	234.87	176.00	
					63	BANANA MINUS SKIN	9	113.71	119.00	
					67	PEAR-FRESH-9%	1	95.00	90.00	
					68	PLUM-FRESH-9%	6	63.00	63.00	
					69	GRAPE JUICE	7	248.57	300.00	
					260	APPLESAUCE	1	84.00	84.00	
			DESR		30	MAPLE SYRUP-ARTIFICIAL	25	63.00	60.00	
					71	JAM	1	26.00	26.00	
					72	JELLY	7	36.43	20.00	
					73	HONEY	3	20.00	24.00	
			BEVER		74	SUGAR	6	5.67	6.00	
					75	COFFEE BREWED	3	365.00	240.00	

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
FEMALE	DAY7	BREX N=48	FAC	FATS COND DAIRY	83	MARGARINE, SOY	12	13.33	12.59
					93	SALT	4	1.58	1.58
					48	MILK-LW-FAT 2%	25	224.48	183.00
					41	MILK 2% CHOC	6	278.67	281.00
					44	YOGURT, W FRUIT YUM YO	1	227.00	227.00
					96	CHEESE-COTTAGE	1	98.00	98.00
					421	YOGURT, TRIMLINE	3	216.00	240.00
					8	EGG, HARD, CHOPPED	4	87.50	160.00
					18	EGG-SCRAMBLED	16	98.46	160.50
					11	BACON-COOKED	14	21.92	21.50
				MEAT	12	SAUSAGE PATTY	6	51.67	53.00
					186	CRN GRD BEEF	1	162.75	162.00
					818	BOLLOMNA	2	43.50	43.50
					415	EGG YOLK	1	30.00	30.00
					423	POLISH SAUSAGE	3	76.00	76.00
					14	GATMEAL	8	164.51	165.50
				GRAIN	16	RAISIN BRAN KELLG	7	34.25	35.00
					19	CEREAL-CORN FLAKES KELLOGGS	8	20.77	21.00
					23	CEREAL-RICE KRISPIES	9	19.69	17.00
					31	PANCAKE	26	86.72	93.00
					33	TAST	8	40.00	54.00
					34	TAST-MIX GRAIN WHEAT	17	23.49	23.00
					422	FRENCH TOAST	6	75.00	96.00
					424	HOT GRITS	3	202.03	209.00
				LEGUM FRUIT	49	PEANUT BUTTER	12	36.87	32.00
					5E	ORANGE JUICE	24	251.72	248.00
					62	APPLE W SKIN	3	64.53	35.00
					63	BANANA MINUS SKIN	26	100.47	119.00
					67	PEAR-FRESH-9%	1	198.00	198.00
					69	GRAPE JUICE	11	242.05	240.00
					288	APPLESAUCE	5	84.00	84.00
					296	NECTARINE	1	112.70	112.00
					38	MAPLE SYRUP-ARTIFICIAL	22	60.00	60.00
				DESSERT	71	JAM	4	19.50	19.50
					72	JELLY	1	21.39	21.00
					73	HONEY	2	18.00	18.00
					74	SUGAR	12	4.47	4.00
					75	COFFEE BREWED	1	845.00	845.00
					83	MARGARINE, SOY	22	8.83	10.00
					85	CATSUP	1	27.00	27.00
					93	SALT	3	1.17	1.50
					8	EGG, HARD, CHOPPED	3	100.00	100.00
					15	EGG-SCRAMBLED	3	92.80	91.00
MALE	DAY7	BREX N=9	FLD	FATS COND DAIRY	423	POLISH SAUSAGE	9	69.24	76.00
					14	OATMEAL	4	214.00	203.00
					32	WAFFLE, PLAIN, COMMERCIAL	3	72.00	72.00
					45	BREAD-WHITE	6	33.83	29.00
					47	BREAD-MIX GRAIN	8	27.00	24.00
				MEAT	422	FRENCH TOAST	5	81.00	90.00
					424	HOT GRITS	4	261.25	271.00

Sex	Date	Meas	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
MALE	DAY7	LUNC N=21	FAC	FRUIT	65	ORANGE JUICE	1	373.28	373.88
					62	APPLE W SKIN	1	193.68	193.88
					63	BANANA MINUS SKIN	5	99.96	119.88
					68	PLUM-FRESH-9%	2	63.68	63.88
					69	GRAPE JUICE	8	383.76	338.88
					36	MAPLE SYRUP-ARTIFICIAL	8	66.26	68.88
					93	SALT	2	1.68	1.88
					48	MILK-LOWFAT 2%	3	315.17	385.88
					41	MILK 2% CHOC	6	419.42	313.88
					355	CHEDDAR CHEESE	1	18.88	18.88
					7	EGG HARD CHOPPED	3	38.33	48.88
					148	BRAISED PORK CHOP	7	88.88	88.88
					294	BACON-COOKED	1	13.88	13.88
					383	VEAL PATTIE BREADED	14	137.88	137.88
					45	BREAD-WHITE	13	58.88	58.88
					47	BREAD-MIX GRAIN	9	46.33	48.88
					167	MACARONI SALAD	2	56.28	56.88
					182	RICE PILAF	18	69.65	78.88
					179	OVEN BR POTATO	18	71.82	85.88
					194	CARROTS, PLAIN,	2	184.58	184.58
					223	CORN, WK PLAIN,	4	56.88	56.88
					224	MIXED VEGETABLES	8	61.74	68.88
					239	CUCUMBER-RAW	2	33.88	33.88
					241	LETTUCE ICEBERG RAW	14	28.39	16.88
					249	TOMATO-RAW	3	52.88	52.88
					57	PEACH DICED CHD	1	138.88	138.88
					65	ORANGE MINUS SKIN	7	196.87	188.88
					68	PLUM-FRESH-9%	2	63.88	63.88
					343	PLUMS, CANNED, HEAVY SYRUP	1	58.88	58.88
					346	FRUIT COCKTAIL, CANNED, LIGHT SYRUP	5	88.58	71.88
FEMALE	DAY7	LUNC N=8	FAC	DESSERT	382	PINEAPPLE CANNED IN JUICE	1	21.88	21.88
					264	JELLO W FRUIT COCKTAIL	2	188.88	188.88
					299	CAKE, BANANA	6	68.54	68.88
					314	CAKE, GERMAN CHOCOLATE	1	63.88	63.88
					328	CARROT CAKE W NUTS	2	84.88	84.88
					68	KOULAID	18	286.94	388.88
					288	TEA BREWED	1	278.88	278.88
					83	MARGARINE, SOY	8	18.88	18.88
					278	SALAD DRESSING-FRENCH	8	21.45	31.88
					276	SALAD DRESSING-THOUSAND ISLAND	1	27.53	27.88
					89	PICKLE SWEET	2	56.88	56.88
					93	SALT	7	1.43	1.88
					288	CHOW MEIN NOODLES	3	9.33	8.88
					292	CRACKERS, SALTINES	3	22.88	22
					48	MILK-LOWFAT 2%	1	385.88	385.88
					355	CHEDDAR CHEESE	1	18.88	18.88
					148	BRAISED PORK CHOP	4	88.88	88.88
					294	BACON-COOKED	1	13.88	13.88
					383	VEAL PATTIE BREADED	2	137.88	137.88

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
MALE	DAY7	LUNC N=19	FLD	GRAIN	45	BREAD-WHITE	1	29.00	29.00
					47	BREAD-MIX GRAIN	3	32.00	24.00
					167	MACARONI SALAD	1	78.80	78.00
				VEGET	182	RICE PILAF	3	66.33	63.00
					179	OVEN BR POTATO	3	82.17	85.00
					186	POTATO SALAD	1	115.20	115.00
					194	CARROTS, PLAIN,	1	110.00	110.00
					223	CORN, WK PLAIN	2	57.75	57.50
					229	COLESLAW	1	128.00	128.00
					241	LETTUCE ICEBERG RAW	1	50.00	50.00
					249	TOMATO-RAW	1	26.00	26.00
				FRUIT	57	PEACH DICED CND	1	0.00	.
					58	PEARS, LIGHT SIRUP PACK,	1	41.00	41.00
						SOLALIQ			
					82	APPLE W SKIN	2	167.20	167.00
					66	PEACH-FRESH-13%	1	98.00	98.00
					68	PLUM-FRESH-9%	1	63.00	63.00
					343	PLUMS, CANNED, HEAVY SYRUP	1	0.00	.
					362	PINEAPPLE CANNED IN JUICE	1	0.00	.
				DESRT	299	CAKE, BANANA	4	58.42	57.00
					328	CARROT CAKE W NUTS	2	82.00	82.00
FEMALE	DAY7	LUNC N=31	FLD	BEVER	80	KOOLAI	5	294.00	270.00
					83	MARGARINE, SOY	5	8.00	10.00
				FATS	273	SALAD DRESSING-ITALIAN	1	24.00	24.00
					290	CHOW MEIN NOODLES	1	8.00	8.00
				CHIPS	292	CRACKERS, SALTINES	1	0.00	.
					140	BRAISED PORK CHOP	8	80.30	79.00
				MEAT	303	VEAL PATTIE BREADED	11	135.75	137.00
					45	BREAD-WHITE	12	48.33	43.50
				GRAIN	47	VEAL PATTIE BREADED	14	34.29	24.00
					51	BREAD-MIX GRAIN	2	43.40	43.00
				VEGET	182	BREAD-AMERICAN RYE	10	51.80	56.00
					179	RICE PILAF	9	85.94	85.00
				FRUIT	224	OVEN BR POTATO	14	61.03	71.00
					241	MIXED VEGETABLES	15	37.50	40.00
				BEVER	65	LETTUCE ICEBERG RAW	10	204.75	225.00
					346	ORANGE MINUS SKIN	17	61.19	47.00
						FRUIT COCKTAIL, CANNED, LIGHT SYRUP			
					80	KOOLAI	18	295.83	300.00
					83	MARGARINE, SOY	9	7.22	5.00
					270	SALAD DRESSING-FRENCH	13	12.60	15.00
					37	SWEET AND LO	3	2.33	2.00
				NONE	140	BRAISED PORK CHOP	13	98.15	88.00
					303	VEAL PATTIE BREADED	17	134.18	137.00
				GRAIN	45	BREAD-WHITE	9	58.00	58.00
					47	BREAD-MIX GRAIN	22	52.15	48.00
					51	BREAD-AMERICAN RYE	2	34.88	34.50
					182	RICE PILAF	23	58.28	66.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NJM	MEAN	MEDI
MALE	DAY7	DINN N=41	FAC	VEGET	179	OVEN BR POTATO	4	85.00	85.00
					217	BRUSSEL SPROUTS STEAMED	9	76.00	80.00
					224	MIXED VEGETABLES	20	64.08	84.00
					241	LETTUCE ICEBERG RAW	18	16.25	15.00
				FRUIT	57	PEACH DICED CND	2	207.00	207.00
					58	PEARS, LIGHT SIRUP PACK, SOLALIQ	7	87.86	82.00
					65	ORANGE MINUS SKIN	13	221.54	225.00
					346	FRUIT COCKTAIL, CANNED, LIGHT SYRUP	13	86.96	95.00
				BEVER	80	KOOLAID	29	310.09	303.50
				FATS	83	MARGARINE, SOY	9	10.58	10.00
					270	SALAD DRESSING-FRENCH	9	16.12	16.00
				CONDI	93	SALT	5	1.90	1.00
				NONE	1	WATER	4	255.00	300.00
				DAIRY	38	COCOA HOT	1	50.00	50.00
					40	MILK-LOWFAT 2%	7	411.75	335.00
					41	MILK 2% CHOC	13	428.57	344.00
					42	MILK-SKIM	1	30.00	30.00
					355	CHEDDAR CHEESE	9	39.00	30.00
					421	YOGURT, TRIMLINE	2	228.00	228.00
				MEAT	7	EGG, HARD, CHOPPED	14	22.59	23.00
					427	ROAST TURKEY	16	84.55	85.00
					428	BRAISED BEEF	25	190.40	192.00
				GRAIN	45	BREAD-WHITE	19	58.00	58.00
					47	BREAD-MIX GRAIN	22	53.13	48.00
					167	MACARONI SALAD	6	83.20	81.00
					182	RICE PILAF	2	52.50	52.50
					429	NOODLES	25	140.30	122.00
				VEGET	172	MASHED POTATOES	11	123.33	114.00
					199	CARROTS, PLAIN,	17	101.20	88.00
					203	SPINICH-STEAMED NO SALT	8	143.75	132.00
					229	COLESLAW	1	64.00	64.00
					239	CUCUMBER-RAW	6	22.00	24.00
					241	LETTUCE ICEBERG RAW	18	52.22	50.00
					249	TOMATO-RAW	13	29.00	28.00
					417	POTATO SALAD	4	131.20	140.50
					426	CARROT RAISIN SALAD	4	134.30	138.00
				FRUIT	62	APPLE W SKIN	7	147.09	176.00
					63	BANANA MINUS SKIN	5	126.14	119.00
					64	GRAPE	1	90.00	90.00
DESRT BEVER					65	ORANGE MINUS SKIN	2	168.75	168.50
					66	PEACH-FRESH-13%	7	95.20	98.00
					67	PEAR-FRESH-9%	6	163.50	180.00
					254	JELLO W FRUIT COCKTAIL	7	105.71	100.00
					75	COFFEE BREWED	2	225.00	225.00
					80	KOOLAID	30	319.50	300.00
					260	TEA BREWED	1	270.00	270.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
FEMALE	DAY7	DINN N=22	FAC	FATS	83	MARGARINE, SOY	18	11.94	12.50
					262	CHIX GRAVY	10	62.92	52.00
					270	SALAD DRESSING-FRENCH	1	43.68	43.00
					273	SALAD DRESSING-ITALIAN	10	32.40	36.00
					276	SALAD DRESSING-THOUSAND ISLAND	2	15.00	15.00
				CONDI	89	PICKLE SWEET	2	65.00	65.00
					93	SALT	6	1.38	2.00
				CHIPS	290	CHOW MEIN NOODLES	7	8.34	8.00
					292	CRACKERS, SALTINES	5	26.40	33.00
				NONE	1	WATER	2	210.00	210.00
				DAIRY	40	MILK-LOWFAT 2%	5	481.90	610.00
					41	MILK 2% CHOC	3	297.35	344.00
					355	CHEDDAR CHEESE	13	38.97	38.00
					421	YOGURT, TRIMLINE	4	240.00	240.00
				MEAT	7	EGG, HARD, CHOPPED	4	13.51	12.50
					140	BRAISED PORK CHOP	5	83.36	79.00
					303	VEAL PATTIE BREADED	2	130.15	130.00
					427	ROAST TURKEY	11	68.68	71.00
					428	BRAISED BEEF	3	105.00	157.50
				GRAIN	45	BREAD-WHITE	6	55.10	58.00
					47	BREAD-MIX GRAIN	13	42.37	48.00
					157	MACARONI SALAD	3	75.20	86.00
					182	RICE PILAF	6	72.33	70.00
					429	NOODLES	3	70.30	105.00
				VEGET	172	WASHED POTATOES	9	110.20	125.00
					199	CARROTS, PLAIN,	7	75.43	85.50
					203	SPINICH-STEAMED NO SALT	4	115.00	115.00
					229	COLESLAW	1	80.00	80.00
					239	CUCUMBER-RAW	5	20.40	18.00
					241	LETTUCE ICEBERG RAW	13	35.98	37.00
					249	TOMATO-RAW	7	28.00	28.00
				FRUIT	417	POTATO SALAD	1	115.20	115.00
					62	APPLE W SKIN	6	127.60	154.00
					63	BANANA MINUS SKIN	2	107.10	107.00
					65	ORANGE MINUS SKIN	1	225.00	225.00
					67	PEAR-FRESH-9%	2	171.00	171.00
				DESRT	74	SUGAR	2	2.00	2.00
					251	JELLO W FRUIT COCKTAIL	4	107.50	100.00
				BEVER	80	KOOLAID	8	286.25	240.00
					260	TEA BREWED	4	202.50	240.00
				FATS	83	MARGARINE, SOY	12	13.33	15.00
FEMALE	DAY7	DINN N=17	FLD	CONDI	262	CHIX GRAVY	9	52.00	52.00
				CHIPS	273	SALAD DRESSING-ITALIAN	5	31.20	36.00
					276	SALAD DRESSING-THOUSAND ISLAND	6	37.50	43.50
					93	SALT	4	.88	1.50
				CHIPS	290	CHOW MEIN NOODLES	6	6.00	6.00
					292	CRACKERS, SALTINES	3	19.25	22.00
				NONE	1	WATER	1	270.00	270.00
				MEAT	427	ROAST TURKEY	6	87.00	95.00
				COMBO	430	BEEF & NOODLES FIELD	11	432.70	395.00

Sex	Date	Meal	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
				GRAIN	45	BREAD-WHITE	2	43.50	43.50
					47	BREAD-MIX GRAIN	15	42.88	48.00
				VEGET	172	WASHED POTATOES	5	98.04	114.00
					199	CARROTS, PLAIN,	8	76.45	88.00
					203	SPINICH-STEAMED NO SALT	4	106.38	115.00
					241	LETTUCE ICEBERG RAW	15	23.00	25.00
					249	TOMATO-RAW	10	11.96	13.00
				FRUIT	62	APPLE W SKIN	6	137.87	138.00
					63	BANANA MINUS SKIN	4	126.44	119.00
					65	ORANGE MINUS SKIN	3	135.00	202.50
					66	PEACH-FRESH-13%	1	29.40	29.00
					67	PEAR-FRESH-9%	2	180.00	180.00
					68	PLUM-FRESH-9%	1	63.00	63.00
				BEVER	80	KOOLAID	16	279.38	270.00
				FATS	83	MARGARINE, SOY	8	8.13	10.00
					262	CHIX GRAVY	5	44.72	52.00
					273	SALAD DRESSING-ITALIAN	1	12.00	12.00
					276	SALAD DRESSING-THOUSAND ISLAND	10	22.50	25.00
				CONDI	93	SALT	6	1.17	1.00
					286	STEAK SAUCE	1	15.00	15.00

Sex	Date	Mesl	LOC	GROUP	CODE	Food Code	NUM	MEAN	MEDI
				GRAIN	45	BREAD-WHITE	2	43.50	43.50
					47	BREAD-MIX GRAIN	15	42.88	48.00
				VEGET	172	WASHED POTATOES	5	98.04	114.00
					199	CARROTS, PLAIN,	8	76.45	88.00
					203	SPINICH-STEAMED NO SALT	4	106.38	116.00
					241	LETTUCE ICEBERG RAW	15	23.00	25.00
					249	TOMATO-RAW	10	11.96	13.00
				FRUIT	62	APPLE W SKIN	6	137.87	136.00
					63	BANANA MINUS SKIN	4	126.44	119.00
					65	ORANGE MINUS SKIN	3	135.65	202.50
					66	PEACH-FRESH-13%	1	29.40	29.00
					67	PEAR-FRESH-9%	2	180.00	180.00
					68	PLUM-FRESH-0%	1	63.00	63.00
				BEVER	80	KOOLAID	10	279.38	270.00
				FATS	83	MARGARINE, SOY	8	8.13	10.00
					282	CHIX GRAVY	5	44.72	52.00
					273	SALAD DRESSING-ITALIAN	1	12.00	12.00
					276	SALAD DRESSING-THOUSAND ISLAND	10	22.60	26.00
					93	SALT	6	1.17	1.00
				CONDI	286	STEAK SAUCE	1	15.00	15.00

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